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FROM GESTURE TO SYMBOL: THE RELATIONSHIP BETWEEN FORM AND MEANING IN THE ACQUISITION OF PERSONAL PRONOUNS IN AMERICAN SIGN LANGUAGE

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From Gesture to Symbol: The Relationship Between Form and Meaning in the Acquisition of Personal Pronouns in American Sign Language

by

Laura Ann Petitto

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Professor Courtney Cazden, Co-Chairperson
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ABSTRACT

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Two central assumptions of current models of language acquistion were addressed in this dissertation: (1) knowledge of linguistic structure is "mapped onto" earlier forms of non-linguistic knowledge; and (2) acquiring a language involves a continuous learning sequence from early gestural communication to linguistic expression. To examine these issues, the acquisition of first and second person pronouns (i.e., I, you) was investigated in a longitudinal study of two deaf children of deaf parents learning American Sign Language (ASL) as a first language. Personal pronouns

in ASL are not formed by arbitrary symbols, but rather are represented by pointing directly to the addressee (to intend YOU), or self (to intend I or ME). Thus, some formational aspects of the pronoun system in ASL resemble paralinguistic gestures which commonly accompany speech and are used pre-linguistically by hearing children. This provides a means for investigating the transition from pre-linguistic gestural communication to linguistic-symbolic communication where both gestures and symbols reside in the same modality.

The results indicate that deaf children acquire knowledge of personal pronouns over a period of time, displaying errors similar to those of hearing children despite the transparency of the pointing gestures. The children exhibited pronoun reversals (e.g., pointing at others to mean ME or pointing at self to mean YOU) which are also seen in some hearing children acquiring pronouns in spoken language. Evidence from experimental tasks conducted with one child revealed that pronoun errors occurred in the comprehension of these pronoun forms as well as production. In contrast to several recent models of language acquisition, this study provides evidence for a discontinuity in the child's transition from pre-linguistic to linguistic communicative systems, even when they share a single channel of expression.

CHAPTER 1: INTRODUCTION

1.1 Theoretical Issues

Studies of child language often involve descriptions of the child's acquisition process, identifying the developmental sequence and errors that children make in acquiring a native language. To a first approximation, the language acquisition process seems quite straightforward: children start out with relatively simple forms which express simple meanings and their language becomes more complex and adult-like as they grow older. In short, their language matures as they mature in other ways. As a result of important studies by Bellugi and Brown (1964), Bowerman (1973), Brown (1973), Bloom (1970, 1973), Slobin (1973) and others, basic facts about the acquisition process as it occurs in various languages have been established. Questions remain, however, concerning the types of underlying knowledge the child brings to bear in acquiring a language, and how this knowledge changes over time. These questions represent the most central, yet elusive, puzzles facing students of child language today, and are the ones to which this dissertation is addressed.

Traditional accounts of the knowledge that underlies the

language acquisition process have been controversial, and at times these accounts have appeared as diverse as the languages that they were describing. However, the existing accounts can be grouped into two general classes based on their assumptions concerning both what is learned in acquiring a language, and how it is learned. On one view (the interaction-based models), language is seen as a part of the child's general cognitive capacity. Although there are various proposals of this type, they share the assumption that linguistic structures are derivative of general cognitive structures, rather than reflecting a specific linguistic capacity. Language is seen as being rooted in the child's non-linguistic knowledge of relations among objects and events in the world. On this view, linguistic structures are built up out of pre-established forms of knowledge, through the child's interactions with the environment. Given the richness of the child's experiences, and the close relationship between linguisitic and non-linguistic forms of knowledge, the child's own contribution to the acquisition process is thought to be restricted to general learning mechanisms. As Shatz (1982) notes, "communication [interaction] -based approaches to the language acquisition problem imply that only a few unconstrained internal mechanisms are needed to explain language acquisition" (p.125).

On a second view (the child-based models), language is considered to involve knowledge structures specific to language; these constitute a distinct task-specific mental capacity intrinsic to the child's makeup. Language is not seen as being built up out of non-linguistic knowledge of the world. Rather, the child is assumed to possess an innate, biologically-given knowledge of the possible forms of human languages (so-called Universal Grammar), and her task is to infer the structure of the particular language to which she is exposed. This view emphasizes the child's contribution to the acquistion process--through her biologically-given linguisitic capacity--while minimizing (although not eliminating entirely) the role of experience.

Jean Piaget (1954, 1955), perhaps the most well-known proponent of the former view, proposed that symbolic representation and, in particular, language emerges out of sensorimotor intelligence. Language is believed to be like other cognitive capacities and not distinct or separable from other forms of cognition; identical knowledge structures are said to underlie a wide range of mental activities such as dreams, mental images, symbolic play and language (Gardner, 1980).

Noam Chomsky's (1957, 1965) stunning claims about the autonomy of the human language faculty from other cognitive functions directly challenged the Piagetian view. Chomsky's

work emphasizes the formal description of linguistic structure, especially syntax. On his view, the primary problem is to account for the child's rapid acquisition of linguistic structures despite wide variation in rearing environments and early experiences. Based largely upon brilliant logical argumentation, Chomsky noted that knowledge of linguistic structure cannot be derived directly from the child's experience with a language. Central to Chomsky's view is the "poverty of the stimulus" argument. Here it is claimed that the child constructs a representation of language from an impoverished and finite sample of linguistic input, characterized by the adult's false starts, self corrections and ungrammatical or simplified utterances. Thus, a child could acquire adult competence only if there was an innate language acquisition device, a "mental organ" with an independent function much like the heart or liver. Further, Chomsky proposed a set of universal structural descriptions to describe possible variations in the forms of human languages. By this account, the language learner generates hypotheses (i.e., "partial and tentative" structural descriptions for the language input), using her innate knowledge of the restricted set of possible grammars, and revises these hypotheses based on the utterances that are heard, until she arrives at the correct grammar for a particular language. This child-based model so dominated

language acquisition research that for a time it appeared that the role of general cognition in child language had been abandoned.

In recent years, however, much research has been conducted, in part, as a rebuttal to the aprioristic and deterministic view of language acquisition espoused by Chomsky and followers such as McNeill(1966). This research has sought to re-establish the role of cognitive and semantic factors in language development (see for example Bates, 1976; Bloom, 1970, 1973; Bowerman, 1973; Brown, 1973; Bruner, 1975; Clark, 1973; Greenfield & Smith, 1976; Macnamara, 1972, 1977; Sinclair-de-Zwart, 1969). In this work, the focus has shifted away from formal descriptions of linguistic (or grammatical) structures to the child's knowledge of the underlying meanings of linguistic forms, and to the natural way in which grammatical structures are built up from cognitive, pragmatic, and social interactions with the environment. This shift marked a return to interaction-based views similar to those espoused by Piaget.

Broadly speaking, there are two ways in which the child's interaction with the environment has been thought to provide her with knowledge of grammatical structures. The first stresses the non-linguistic roots of language development and takes a "cognition first" viewpoint: grammatical structures are said to be "mapped" onto a

pre-established cognitive base (Shatz, 1982). The second stresses the role of the caretaker's linguistic input; the child is said to derive knowledge of grammatical structures from the sentential and conversational structure of mother's language.

Jerome Bruner (1975), a proponent of the first view, proposes that the child's knowledge of grammatical structure, that is, semantic categories and word order, emerges out of sensorimotor intelligence and joint action patterns between mother and child (e.g., eye-to-eye contact). He suggests that an isomorphic relationship exists between the structure of action and grammatical structure: "What is universal is the structure of human action in infancy which corresponds to the structure of universal case categories. It is the infant's success in achieving joint action (or the mother's success, for that matter) that virtually leads him into the language" (p.6). Basing his grammatical description of language on Fillmore's (1968) semantic case categories, Bruner proposes that the child's knowledge of both these semantic categories and word order arise in the following way: Drawing upon sensorimotor intelligence, the child constructs elementary meaning categories from those relations between objects, events, and people that she sees and jointly acts upon with mother. These "pre-semantic" meaning categories purportedly give rise to semantic categories such

as agent and action. Words are attached to these concepts to express elementary sentences which initially denote the precise, literal relationships that the child sees around her (hence, the "natural" origin of meanings and sentential word order). Thus, through general cognitive functions, the child is supplied with its early grammar. By this account, learning a language involves the mapping of linguistic forms onto pre-established meanings.

In a similar vein, other researchers have proposed that infant gestural systems also serve as the non-linguistic foundation upon which linguistic forms are directly mapped (e.g., Bates, 1976; Bates, Camaioni, & Volterra, 1975; Bates et al., 1979; Bruner, 1975; Clark, 1978; Escalona, 1973; Lock, 1979; Greenfield & Smith, 1976; Macnamara, 1972, 1977; Piaget, 1954; Volterra, 1981; Werner & Kaplan, 1963; Zukow, Reilly, & Greenfield, 1980).

Elizabeth Bates (1979), for example, suggests that vocal naming grows out of the child's ability to use manual gestures that function like names for the (hearing) infant. She observes that infant gestural activity (beginning around 4 to 6 months) evolves into symbolic manual gestures, arising gradually from interaction with the environment, in much the same way the "vocal symbols" (words) evolve. Because children around the age of 13 months use manual gestures (e.g., stirring hand movement upon noticing a spoon) in

similar ways as early referential words (e.g., saying spoon upon noticing a spoon), it is concluded that these "symbolic" manual gestures and words are isomorphic in function and are guided by identical underlying cognitive processes (Bates et al., in press). Bates observes that both manual gestures and words initially occur in the same communicative contexts, although manual gestures are used more as a means to represent objects in "personal cognition" rather than used communicatively; given that the spoken words are assumed to belong to grammatical categories such as nouns and verbs, a manual gesture must also be considered to be a kind of "noun or object name" (Bates et al., in press). From this analysis, the researchers conclude that naming is <u>outside</u> of the linguistic system (and the "vocal channel"), and exists pre-linguistically as a part of the child's general cognitive capacities. Eventually children build upon this cognitive naming base with vocal symbols that become more differentiated from manual gestures and supercede them, in part because they permit greater flexibility of expression.

Discussions of the role of pointing, a particular kind of gesture, in the emergence of language further exemplify this view. Eve Clark (1978) has proposed that the child's knowledge of the meanings of verbal deictic words, or context-bound indicating terms such as <u>here</u> and <u>there</u> and <u>you</u> and <u>me</u>, emerges directly out of early deictic pointing

gestures in a natural and continuous progression (see also Bates, 1976; Bates et al., 1975; Bruner, 1975; Leopold, 1949; Werner & Kaplan, 1963). A hallmark of human development is said to be the onset of pointing gestures at around 9 months. Pointing is thought to be a complex behavior, itself built up from earlier gestures in the following stages: the child reaches and grasps (taking objects "inward"); "shows off" (e.g., imitative clapping in the patty-cake game); shows objects; gives objects (extending objects "outward"); points to objects without communicative intention (i.e., does not visually seek adult to share gaze); and finally points to objects with communicative intention (i.e., visually seeks adult to share gaze; Bates et al., 1975; Werner and Kaplan, 1963).[1] That pointing develops in this way has been used to infer changes in the organization of internal mental "schemes" (Bates et al., 1975). For example, early non-communicative pointing is said to represent the child's emerging ability to recognize and distinguish self from external, distant objects (Werner and Kaplan's Gestalt-based concepts of emergence and distancing). By contrast, the later-emerging communicative pointing serves as the foundation for referential behavior and the concept of reciprocity arising from mother and child's joint actions and shared visual regard (Werner & Kaplan, 1963). Bates et al. (1975) further analyze the illocutionary (intentional)

function of pointing gestures as protodeclaratives and protoimperatives because they function to direct the adult's attention to objects, events, or people, and to convey requests. Finally, Clark (1978) analyzes pointing gestures as nascent markers of definite and indefinite reference (i.e., the precursors of "the" and "a").

Once pointing gestures are firmly established, verbal deictic terms are said to be mapped onto these "pre-linguistic placeholders" (Bruner, 1981) in the following way: the child points to pick out an object; she then points and simultaneously uses a verbal deictic marker such as "Da" for "there"; the child combines the deictic word (e.g., "Da") plus another word (e.g., ball), plus the point; finally, child speaks without pointing (Clark, 1978). Further, this sequence is thought to reflect not only the degree of complexity, but also the order of acquisition of the spoken forms.

In sum, while Bruner (1975) emphasizes that language is mapped onto pre-established meanings, Bates, Clark and others emphasize that language is mapped onto pre-linguistic gestures.

In a second interaction-based approach to language acquisition, the child's knowledge of grammatical structure is said to be derived from the structure of mother's sentential input and other aspects of the discourse and

social-interactive context. Here, grammatical structures are "imparted" by the caretaker for the child to learn. Some researchers claim that mothers tacitly "fine tune" their utterances to match the child's emerging grammatical competence, supplying the child with language forms which contain just the amount of grammatical complexity that can be handled by the child at a given time (e.g., Snow, 1972). Other researchers suggest that the structure of mother-child discourse, including the mother's recastings and expansions of the child's utterances, and her own sentential permutations, may serve to emphasize particular features of the target language and consequently facilitate the child's acquisition of these grammatical forms and relations (e.g., Greenfield & Smith, 1976; Keenan & Schiefflin, 1976).

A similar view of how language is related to social and pragmatic factors is provided by Bates and MacWhinney's so-called functionalist approach (Bates & MacWhinney, 1982; MacWhinney, 1980; MacWhinney & Bates, 1978). They view language primarily as a social tool: hence, the communicative functions and use of language are stressed. The focus of their acquisition research is on how the child learns to use linguistic <u>forms</u> to express multiple communicative <u>functions</u>. The communicative functions of language serve as the basis for the categorization of underlying meanings, and are said to be derived directly from

the relations between people, objects, and events that are given in the world. The child merely has to search for the correct surface linguistic form to fill a particular "functional slot". Here again, grammtical structure (i.e., syntax) is said to be mapped onto pragmatic functions by using a process which is similar to general problem-solving. Thus, by correlating the linguistic form with its functional meaning, the child can learn to use linguistic forms "without any clues about linguistic structure" (Bates & MacWhinney, 1982, p.184). Gleitman and Wanner (1982, p.41) have summarized this approach as asserting "that general social-interactive properties of mother-child discourse will causally determine the actual form-meaning pairings the child learns". In the Bates and MacWhinney functionalist approach, grammar is the result of natural functional categories and certain performance constraints on the developing child (e.g., memory). The strongest version of the functionalist hypothesis, however, is one in which "abstract or purely formal grammars are viewed as epiphenomena of natural processes" (Bates & MacWhinney, 1982).

In summary, the second set of interaction-based models suggest that the task of the language learner is to listen carefully to the structure of mother's sentences and conversational patterns, attend closely to what functions the linguistic forms serve, and--because the child wants to

communicate--learn these forms.

As reviewed above, the interaction-based models place the burden of language acquisition on the child's early cognitive capacity and other external factors in the environment. These models, in part, arose as a reaction to the apriorism of Chomsky's language acquisition device. However, they represent a new kind of apriorism: cognitive apriorism or what Slobin (1982, p.129) has described as a "new apriorism [which] is based on claims of 'naturalness' in the means used by humans to map underlying semantic and pragmatic content onto surface utterances". Slobin observes that one major problem with this new apriorism is that it "attributes the essentials of linguistic structure to the child before he or she has begun to master the particular native language" (p.128).

There are at least two additional problems with these models that become immediately apparent when considering what the child's underlying knowledge might be and how it changes over time.[2] First, the rather obvious problem is simply that, in general, they do not specify how the child might acquire language except in that it is guided by general cognitive or learning strategies. The cognitive processes employed in language acquisition are not specified in any detail. Perhaps this is due, in part, because the child is relegated a relatively minor role in these models compared to

the relatively heavy weight assigned to the environment. In these models, the locus of control of the language acquisition process is extrinsic to the child, in that the environment provides the basis for the linguistic structures that will be extracted. Exactly what the child contributes to the language acquisition process is unclear. The child's cognitive processes are often described by invoking "mapping" metaphors which are unexplained (Shatz, 1982). Similarly, Bruner (1975) describes the mental process that the child uses to match grammatical structures with action as one of "analogy", but does not describe the source of the analogizing capacity. Nor does he describe how the child knows which specific grammatical structures and actions are to be related by analogy, given the myriad of choices provided by the environment. Further, a single environmental event can be described by using many different sentences. A well known example illustrates this point: A scene appropriate to the description "The cat is on the mat" is also appropriate to "The mat is under the cat", "The green mat is under the cat", "The cat is on the new mat" and "Get that cat off my new mat" (Gleitman, 1981, p.103).[3] To understand the nuances of these related utterances, and to meaningfully interpret the scene in relation to these utterances would seem to require knowledge which transcends the bounds of straightforward "analogic" strategies between

surface forms and real-world events.

A second, related, problem with these models concerns their implicit assumptions regarding what the child's knowledge base must be in order to employ the "mapping" and "analogy" strategies in the first place. To acquire language in the manner that these models propose, the child must have a rich non-linguistic base sufficient to support a linguistic system, and an ability to attend to and utilize information in the environment. The extent to which this is the case remains an unresolved empirical issue.

Leaving aside these criticisms, the fundamental claim linking the various interaction-based accounts is that language emerges out of non-linguistic forms of knowledge and experience. This claim stands in sharp contrast to Chomsky's belief--and that of more recent proponents of related views such as Roeper (1981) and Wexler and Culicover (1980)--that language emerges as the expression of a linguistic faculty. These positions clearly differ in terms of their assertions about knowledge underlying the acquisition process and how this knowledge changes over time. On one hand, the interaction-based models suggest that linguistic structures are closely related to--indeed, parasitic upon--prelinguistic communicative competence. Language is not a formal system in its own right, but seen as "built up" from pre-language, "mapped onto" it, created by "analogy" to it, or simply

learned entirely from environmental input. The essential continuity of language and other, non-linguistic forms of knowledge is the central concept linking the various interaction-based models. Construed as a testable hypothesis about the language acquisition process, it implies that the transition from pre-linguistic communication to linguistic competence should be relatively smooth (although not necessarily error-free). That is, if linguistic structures are derived from pre-linguistic forms, there should be no abrupt discontinuity in the use of these differing forms.

On the other hand, if language is a distinct formal system reflecting a particular mental capacity, not wholly built up from early communicative competence, a clear empirical prediction is that the transition from pre-linguistic to linguistic expression should be discontinuous, marked by evidence of the reorganization of knowledge regarding the function and use of linguistic forms once they become part of a formal grammatical system.

1.1 Objectives of the Present Study

The main objective of the present study was to obtain some empirical evidence bearing on these positions, specifically concerning the child's transition from pre-linguistic communication to linguistic symbolization. This question was pursued in a way thought to circumvent some

of the methodological problems that typically cloud studies investigating this issue. The transition from pre-linguistic to linguistic communication was investigated with regard to the acquisition of pronouns in American Sign Language (ASL). Studying this issue in the context of the acquisition of a signed language provides a unique methodological advantage in that both pre-linguistic gestures and linguistic forms reside in the same modality. In particular, personal pronouns in ASL have the same form as pre-linguistic pointing gestures. With a single modality, and external articulators, the developmental process can be directly observed over time. In spoken language, of course, this is not the case; there are internal articulators and the child's transition from gesture to symbol is marked by a change in modality. For hearing children, there appears to be an abrupt transition from the use of pre-linguistic manual gestures to linguistic (spoken) communication; however, this could be an artifactual consequence of the shift in modality, rather than reflecting a deeper discontinuity. In studying a signed language, the assumptions of continuity between pre-linguistic and linguistic forms in language acquisition can be addressed directly, as well as the related question as to whether language is distinct from other cognitive capacities.

What is at issue here is not whether cognitive, social, or pragmatic factors play a role in language acquisition.

Clearly, all parties agree that they play a major role and it is not the purpose of this paper to dispute this. Nor is the goal to argue whether early semantic categories are built up from pre-linguistic or sensorimotor intelligence (the "cognition-first" position); this seems to be supported by other research and the fact that semantic categories may provide the foundation for the early acquisition of linguistic forms seems plausible. Finally, I will not be addressing radical versions of the nature-nurture issue; that is, whether the child is born with abstract grammatical categories such as "subject of the sentence" or "predicate", or whether language is entirely "constructed" from environmental information. This is not a theoretically fruitful path to pursue. The more interesting question concerns the extent to which the mapping between the child's cognitive conceptualizing of the world and the categories used in formal linguistic systems can be said to be one and the same thing (Slobin, 1982).

To be clear, I am interested in the two central tenets of the interaction-based models described above: (1) <u>the direct mapping issue:</u> is the child's knowledge of a language merely built up from, or "mapped" directly onto already existing pre-linguistic knowledge of the world?; in particular, is language a specific formal system not entirely derivative of general cognition, and (2) <u>the continuity</u>

issue: does acquiring a language involve a continuous learning sequence? The first question addresses what types of knowledge the child brings to bear on the acquisition process; the second question addresses how the acquisition process proceeds over time.

In this paper, I will suggest that acquiring a language involves much more than the elaboration of pre-linguistic knowledge. Language is a distinct formal system whose components and structures must be discovered in their own right. In addition to asking questions concerning the nature of the knowledge that the child brings to bear in acquiring a language, and how this knowledge changes over time, I will consider why these changes occur.

Footnotes for Chapter 1

1. Researchers vary in how they categorize the early gestures that lead up to actual pointing. Werner and Kaplan, for example, view reaching and grasping as distinct from pointing in that the former involves taking things "in", the latter denoting "out" from the child to the environment. As such, they would not include them on the same continuum as pointing. Bates et al. found that "giving objects" and pointing (with communicative intent) can co-occur. The general sequence and class of emergent gestures are indisputable, however.

2. A detailed account of the criticisms of these positions can be found in Gleitman and Wanner (1982), Shatz (1982), and Slobin (1982).

3. Quine provides the classic discussion on this topic in Word and Object (M.I.T. Press, 1960).

CHAPTER 2: BACKGROUND

2.1 The Acquisition of Personal Pronouns in Hearing Children

2.1.1 Personal pronouns. First and second person personal pronouns (i.e., I and you, respectively) encode the most basic aspect of a conversation between two people: they encode the participants themselves (Charney, 1978). Personal pronouns are found in all languages, and have both a lexical and deictic (or indexical) function. Lexically, they can be marked for case and have other morphological and syntactic functions; deictically, they point to actual relations in the speech context (Ingram, 1971). In this respect, personal pronouns differ from other words because their meaning can only be interpreted with respect to the speech event. That is, the meanings of the pronouns I and you shift depending upon who is actually speaking at a given time. The same holds for deictic terms denoting, for example, time (now or yesterday), and place (here or there), which can be understood by the listener only by understanding the perspective of the speaker at the time of the utterance. In contrast, the meanings of most other words do not shift with a

change in speaker. For example, proper names such as Sara, or category names, such as table, do not change their meaning within a particular context with every change in speaker turn. For this reason, personal pronouns have been said to have "unstable" or "shifting" referencing properties, while most other words have "stable" referencing properties (Jakobson, 1957; Jespersen, 1924; Lyons, 1977).

Third person pronouns (e.g., he or she) are not universal (Lyons, 1977), and differ from first and second personal pronouns in their deictic and anaphoric functions. Whereas first and second pronoun referents are immediately discernable from the context, third person pronouns are not deictic in this way. Further, two members of a conversation can jointly refer to a third party as "She" for example, and be designating the same person. Thus, the meanings of third person pronouns do not necessarily change with every change in speaker turn, but depend upon the specific circumstances within the discourse context. Unlike first and second person pronouns, third person pronouns are used anaphorically, that is, as coreferential with a previously established noun phrase as in "Ruth went to the cricket match. She played on the winning team." Finally, third person pronouns generally do not refer to the conversational participants themselves. That is, one generally would not speak of oneself while in speaker role as in "Martha (person in speaker role) went to

the store today. She (again, person in speaker role) bought some notebooks."

2.1.2 Personal pronouns and the language learner. Personal pronouns present the child with a special problem. These forms cannot be learned by simple association between the observed meaning of the symbol and its acoustic form (as could be the case in learning the name of the family dog). Nor can personal pronouns be used like other proper or common nouns. Instead, the child is compelled to analyze their structure and consider the conversational context in determining their meaning. As speaker, the child may refer to herself by using me (or I). As listener, however, the child is referred to by a completely different set of pronoun forms: you--the very form which she must use to refer to adults, not self--and she or her. Thus, the child must learn one set of terms when she is the speaker and a different set when she is the listener. Finally, the child must also learn that these terms are not within the exclusive domain of her particular relationship with family members, but that adults can also use these same forms among themselves: the child can be me, but so can mother.

2.1.3 Acquisition of personal pronouns in hearing children. Not surprisingly, young children learn personal pronouns in ways unlike words for actions or objects. The general profile of their development includes the fact that

they begin to use pronouns relatively late compared to the onset of their first words, beginning around 18 months, and learn the rules for their use over a period of time ending around 27 months. Most children begin to use pronouns in a particular order: first person pronouns (either I or me) are learned first and require several weeks or months to learn their semantic equivalence and syntactic contrast (me, for example, is marked for case and cannot function as the subject of a sentence). It is frequently reported in the literature that children use proper names for self and family members both prior to the acquisition of pronouns and during the time when control of their use is still evolving. It has been suggested that children might use proper names so as to avoid the use of pronouns which, from the child's perspective, may have ambiguous referential properties (e.g., Charney, 1978, 1980; Chiat, 1981, 1982; Macnamara, 1982; McNeill, 1963; Strayer, 1977). Finally, several researchers have observed that pronouns are initially acquired as unanalyzed wholes--that is, not analyzed as separate morphemes and often embedded in syntactic structures where they are not the primary focus. An example of this is the phrase "gimme". If the child's goal is to receive something, use of this phrase could accomplish that goal without the child's comprehending the pronoun me. In such contexts, then, the pronoun me may not receive the child's attention

and could be learned by rote (e.g., Charney, 1978, 1980; Chiat, 1982; Clark, 1978; Cooley, 1908; Fraiberg & Adelson, 1975; Leopold, 1949).[1]

Although pronouns are acquired later than other forms, the relatively few production errors have led some researchers to conclude that pronouns do not present the child with a special problem (e.g., Bloom, Lightbown, and Hood 1975; Huxley, 1970; Nelson, 1975, Sharpless, 1974; Shipley & Shipley, 1969). However, other researchers have called this interpretation into question (e.g., Chiat, 1981, 1982; Charney, 1978, 1980; Clark, 1978; Macnamara, 1982). These researchers have studied the child's emerging knowledge of speech roles and have focused on both the asymmetry between comprehension and production of personal pronouns and the child's pronoun reversal errors. They suggest that children do not seem to initially learn personal pronouns as related reciprocal pairs, but instead learn them as isolated lexical items (Charney, 1978, 1980; Macnamara, 1982; McNeill, 1963). That is, children initially do not use personal pronouns <u>deictically</u>. Further, the comprehension and production asymmetries and order of pronoun acquisition suggest that the child's understanding and use of pronouns is learned first from their own role as addressee; only later do they master the reciprocal pattern of pronouns (Charney, 1978, 1980; Macnamara, 1982).

McNeill (1963), for example, studied one girl ("Eve" from Brown, 1973) from 19-27 months in monthly sessions with her mother to examine the child's production and comprehension of personal pronouns. At the study's onset, Eve used proper names to refer to self and others. When her pronouns emerged, McNeill noted that Eve did not use these terms deictically to refer to the coordinates of "speaker" and "hearer". Instead, Eve had two pairs of non-relational pronouns with fixed referents--one in production and one in comprehension: Eve's I and mother's you formed one subsystem termed the "personal subsystem", and Eve's you and mother's I formed an independent subsystem termed "addressee subsystem". McNeill suggested that each pair of I and you formed a pair of homonyms for the child, although we are not told how such strategies develop. Further, Eve produced I in speaker role before you, and comprehended you before I when she was the addressee. Ultimately, these pairs of non-relational "homonyms" had to be merged into a relational coding scheme. The main point, however, is that the child's first approximation to the pronoun system began with her use of personal pronouns as non-relational and fixed-referent words.

Strayer (1977) studied 4 girls from ages 22-32 months in bimonthly taping sessions with their mothers, to examine the children's production and comprehension of pronouns. She found that children used proper names for themselves (before

using personal pronouns) more frequently than their parents used proper names to refer to them. Strayer also observed an asymmetry between the child's comprehension and production of personal pronouns: comprehension of you and your preceded I and my, but the child produced I and my more frequently than you and your (Macnamara, 1982; Strayer, 1977). Strayer concluded that children seemed to learn the member of the reciprocal pronoun pairs that involved themselves first. Charney (1978) found a similar pattern of personal pronoun development in 21 girls aged 18-30 months. She observed that most children initially learned the pronoun form that referred to them within each speaker-addressee role and characterized this use of pronouns as "person-in speech-role-referring". Thus, children produced my before your and understood your before my. She also found that children sometimes produced me without understanding it and that they always understood you to refer to themselves as addressee before they understood it to refer to others. Based upon this developmental sequence, Charney proposed that the young child did in fact attend to speech roles, but initially only to those that they themselves occupied.

2.1.4 Pronoun reversals. The status and interpretation of pronoun reversal errors is still in question. A general characterization of this error is the child's use of a first person pronoun (e.g., me) to refer to the addressee rather

than self, and second or third person pronouns (e.g., <u>you</u>) to refer to self rather than addressee. An example of a child producing <u>you</u> in self reference is reflected in the following conversation between Nigel (aged 1;11) and his mother (Halliday, 1975; cited in Clark, 1978, p.101).

Mother	What do you want?
Nigel	Daddy toothbrush
Mother	Oh you want Daddy's toothbrush, do you?
Nigel	Yes...You want to put the frog in the mug. (you=I)
Mother	I think the frog is too big for the mug.
Nigel	Yes you can put the duck in the mug ...make bubble...make bubble. (you=I)

With the recent analyses of this phenomenon by Charney (1978, 1980), Chiat (1981, 1982), and Clark (1978) two questions have arisen: (1) why don't more children make pronoun errors?; and (2) why do some children make them? Charney (1978) offers an analysis of why children generally do not perceive pronouns to have fixed-referents like names. Briefly, she suggests that the way children initially learn pronouns biases them <u>against</u> making reversal errors in the following way. Charney found that early pronouns are initially learned not as analyzed units, but as part of expressions which claim objects or encode actions. What is most relevant to the child in these contexts is generally the object or action rather than person referencing. Children are said to extract out information about pronouns only after

they analyze the whole utterance with respect to the context. By contrast, proper names have unique status in language, and are especially salient to children because adults frequently use them alone as vocatives. In other words, "names may be used in contexts promoting the name's association with a particular person, whereas pronouns may be embedded in action or syntactic contexts" (Charney, 1980, p. 526). Charney concluded that children should be unlikely to confuse pronouns with names and should regard them as distinct word classes with unique functions.

The question as to why some children nonetheless make pronoun errors has been the source of controversy (e.g., Chiat, 1981, 1982). Although reported previously in the literature (see Clark, 1978, for a review of reversal errors in several languages spanning over 70 years of diary studies), until recently little attention has been paid to these errors, and little is understood about the underlying cognitive processes of the children who produce them. A primary reason for this is a confusion in the literature about the underlying cause of the errors which, for a time, was assumed to signal childhood psychopathology. Some psychiatrists and psychoanalysts--regarding pronoun errors as evidence of the child's "loss of self"--used pronoun errors as a diagnostic tool for several emotional disorders including autism (e.g., Bettelheim, 1967; Kanner, 1949). Of

late, psychological and linguistic researchers have discovered that this phenomenon is more common among children than previously realized and it has become an area of intensive study. Researchers are finding that pronoun reversal errors in "normal" children are not due to psychopathology, but instead to the complex coreferential and shifting functions that pronouns have in language.

Several aspects of these errors, however, make them a particularly challenging class of linguistic errors to explain. First, errors are inconsistent both within and across children. For example, Chiat (1981) found two children who at times used me correctly in self-reference and who at other times used me incorrectly to refer to adults. Other researchers suggest that the errors occur primarily in rote constructions (e.g., Cooley, 1908). Further, a close reading of the literature reveals that they are partial (not full or symmetrical) errors and, hence, although termed as such, they are not really pronoun "reversals" in the strict sense of the word. That is, the child will produce you to refer to self, but not me to refer to the adult. In fact, of the handful of recent studies that exist on this topic, none of the reversals are symmetrical. Chiat's (1982) recent analysis of one pronoun-reversing boy (aged 28-29 months) suggests, for example, that children can have both adult-like deictic pronouns which are "speech-role-referring" and

non-deictic pronouns with non-adult functions simultaneously. Specifically, this child had a correct and adult-like "perspective-shifting" pronoun--me, and an incorrect "egocentric" pronoun--you, at the same time. What does seem to be consistent across children, however, is the onset time of the errors. Most researchers report the you=child error to begin around 2 years, the time when the first occurrence of you appears in the child's lexicon. Furthermore, the errors generally last for a short period of time--from several days to several weeks. Finally, pronoun reversing children are uncommon: many more children do not make pronoun reversals than those that do (Chiat, 1982; Charney, 1978, 1980; Clark, 1978; Macnamara, 1982; Strayer, 1977).

Recently, two researchers have attempted to characterize the child's knowledge underlying pronoun reversal errors. Clark's (1978) proposal will be termed the "proper name hypothesis". She observed that children first use first person pronouns without attending to their shifting nature, in part because their early pronoun use may be formulaic. Once children begin to produce you they must decide on its relation to first person pronouns. From the perspective of the pronoun reversing child, the adult's you always refers to the child and is used in alternation with her name. Similarly, the adult's I is an alternate for their name (i.e., replaces Mommy or Daddy). Thus, the child might

formulate the erroneous hypothesis that pronouns are a type of name: you=child and I=adult. Charney (1978, 1980) characterized pronoun reversing children as possessing a "person-referring" hypothesis because the child learns all pronouns from her own perspective without regard for discourse roles. Thus, because the child hears mother use you to refer to the child, the child will also use you to refer to herself. Likewise, the child hears mother use me to refer to herself (mother); thus, the child also produces me to refer to mother. As in Clark's account, the child's representation of these forms is said to be that you=child and I=adult.

These two positions are similar both in their underlying assumptions and in their predictions. The central assumption shared by these two accounts is that the primary responsibility for the child's errors rest in her inability to take on the perspective of another person. The child cannot shift from her own perspective to that of the adults' and therefore fails to grasp the reciprocal and relational nature of pronouns. Thus, the pronoun reversing child errs because she is egocentric. The notion of the young child as an egocentric being is one of the most basic concepts in developmental psychology, and has been used in descriptions of their behavior and as explanations of their thinking (Bloom & Lahey, 1978). Most closely identified with this

view is Jean Piaget (1955) who stated that "throughout the time when he is learning to speak, the child is constantly the victim of a confusion between his own point of view and that of other people" (p.39). He further claimed that the young child's egocentricity prevented him from understanding and using the point of view of the listener in conversation (see also de Villiers & de Villiers, 1974). In both Clark and Charney's accounts, the child, being egocentric, should begin with no sensitivity to speech roles and, hence, no understanding of the reciprocal relations inherent to personal pronoun pairs. The prediction that follows is that the young child will initially use pronouns in a fixed, non-relational manner to refer to people regardless of which speech role they occupy and--as suggested by Clark--should regard pronouns as proper names. The strongest interpretation of the egocentric hypothesis is that the child should consistently produce full (symmetrical) pronoun reversals, calling herself, you, and an adult, me, since pronoun relations in speaking are retained exactly as they were experienced in listening. Furthermore, the child should misunderstand me when used by anyone other than mother, and not understand you to refer to anyone other than the child herself.

The inconsistent and partial pronoun reversal errors reported in the literature do not seem to support this

version of the egocentric hypothesis. Nevertheless, it is clear that more detailed descriptions of the child's comprehension and production errors are needed before we can fully determine the explanatory adequacy (or inadequacy) of the egocentric model. At present, this remains an open empirical question.

In summary, it appears that the child begins by using proper names along with some sporadic and unstable early use of a first-person personal pronoun (I or me), then acquires pronouns that are central to herself in the speaker role, and only later masters the reciprocal nature of pronouns. Although a full characterization of the pronoun reversal phenomenon is as yet unavailable, the existing accounts suggest that some children make intriguing pronoun reversal errors en route to mastering the pronominal reference system.

2.2 The Acquisition of Personal Pronouns in Deaf Children Learning ASL

2.2.1 Personal pronouns. American Sign Language, a natural language used by most North American deaf people, has structural and semantic properties similar to those of spoken language (Klima and Bellugi, 1979; Stokoe, 1975; Wilbur, 1979). A primary difference between signed and spoken languages, however, is in the mode of transmission; in ASL,

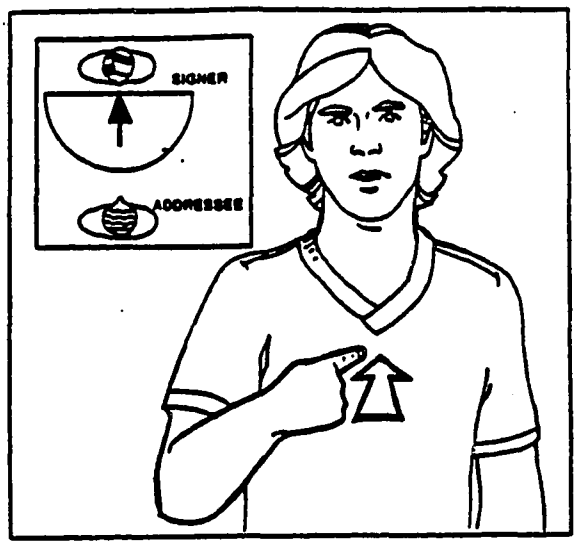
signs--symbolic units analogous to words--are produced with the hands (and co-occur with other non-manual linguistic markers such as the mouth and brow) and are comprehended with the eyes. Because symbolic transmission occurs primarily in front of the signer's body, both space and movement have a complex formal role in the language's grammatical structure. That is, the continuous, analogue, and non-discrete properties of space and movement are used in ASL in systematic and rule-governed ways. These abstract spatial and movement units are analogous in function to the discrete and non-continuous morphemes found in spoken language. Further, some linguistic symbols have non-arbitrary relations to meaning. Indexical signs point to their referents while the forms of iconic signs resemble aspects of their meaning. Thus, sign languages are unique in that some of their symbols have transparent form-meaning correspondences.

Personal pronouns in ASL comprise a class of linguistic symbols with just this indexical property. First and second person personal pronouns in ASL are not formed by arbitrary symbols, but instead by pointing indexically to the intended referent. Specifically, the first person pronoun ME is signed by the person in speaker role by pointing directly to his own chest. (First person pronouns are not case-marked in ASL; ME is the conventional gloss for this sign.) The second person pronoun YOU is signed by the person in speaker role by

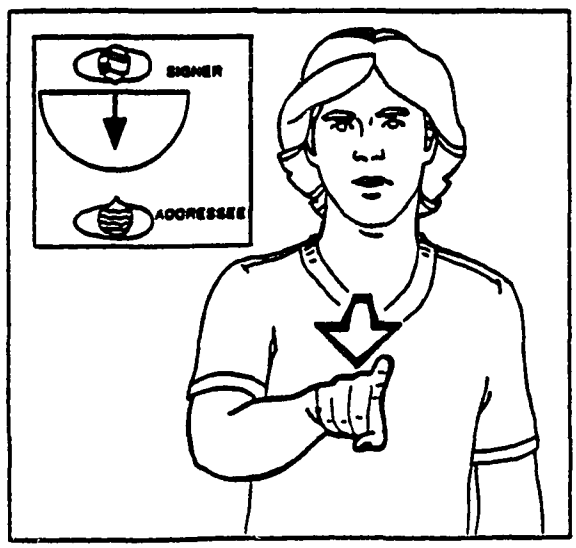
pointing directly towards the addressee (Figure 1).[2]

As is the case in spoken language, third person pronouns in ASL have complex deictic and anaphoric functions. Third person pronouns used to reference people who are present in the discourse context are signed by the signer in speaker role by pointing directly to the third person referent. In this way, third person referencing is similar to first and second person referencing described above. However, when the referent is either not present or else temporally distant, pointing is directed to arbitrary spatial loci along a horizontal plane in front of the signer's body. In this way pointing can be used to refer to noun phrases which denote not only people, but also objects and locations in space. Subsequent referencing (or anaphora) requires that the signer point (gaze or shift the body) to the previously established spatial locus. The establishment of spatial loci is an obligatory linguistic device that interacts in complex ways with the verb agreement system (see Kegl, 1977; Padden, 1979, 1981, 1983; Bahan & Petitto, 1980; Wilbur, 1979). Except for ASL's use of spatial devices to signal anaphora, the coreferential relations signaled between the head noun phrase and subsequent pronominal referencing are functionally identical to anaphoric devices found in spoken language.

In considering the way other deictic terms in ASL are signed, a central difference between signed and spoken



ME



YOU

Figure 1.
ME and YOU Signs in ASL

languages is revealed. In English, for example, each class of relational deictic terms takes distinctly different forms. Relational deictic terms of place, for example, can be expressed by the forms here and there, demonstrative deictic pronouns can be expressed by the terms this and that, deictic terms of movement by the forms come and go, and so forth. In ASL, however, all deictic expressions of this nature are signaled with the pointing form: the same form which is used for first, second, and third personal pronouns and used in anaphoric referencing. In ASL discourse, as in spoken language, the meaning of these pointing forms is dependent upon their relational meanings which are understood by the addressee only after taking on the perspective (or role) of the signer. What is unique in ASL is that all semantic functions represented by the different deictic terms in English are signed with a formationally identical pointing form.

2.2.2 Personal pronouns in ASL and the language learner. During a conversation between two people in ASL, YOU and ME personal pronouns are formed by pointing either directly to one's self or to the other person. Except for reaching out and touching the person in addressee role or grasping one's own chest in speaker role, the expression of YOU and ME pronouns in ASL appears to be the most unambiguous possible means of signalling these relations. That there exists an

indexical correspondence between the pointing form and its intended referent might lead to the prediction that the child's acquisition of YOU and ME personal pronouns should be nearly effortless. These pronoun forms are formationally identical to the pointing gestures commonly used as pre-linguistic indicators by hearing infants and as paralinguistic gestures accompanying speech. Assuming that deaf children also engage in pre-linguistic communicative pointing, it might be expected that the child's acquisition of these pronoun forms should not be troublesome, and in fact, learned in a straightforward manner.

Alternatively, the fact that the pointing form has multiple linguistic functions may present the child with some difficulty in acquiring the rules for its use in pronouns. In addition to grammatical functions outlined above, the pointing form is also one of the primary "phonological" units in the language, occurring in full lexical signs such as the nouns CANDY and CHINESE, verbs such as GO and COME, and adjectives such as RED and UGLY. It also comprises one subset of the class of morphological forms called classifiers, which function in the language to represent some physical component of a previously specified noun. These pointing forms, having had their referent established, are subsequently used in the language in pronominal and verb-like ways to denote specific semantic information about the nature

of the noun referent's size and shape, and/or movement and location (Supalla, 1982). Finally, in addition to the formal deictic functions served by the pointing form, there is a limited use of pointing as paralinguistic gestures. In this light, the child's task of sorting out the grammatical and semantic functions of the pointing form seems quite formidable. Thus, if the child does not attend to (or exploit) the indexical relationship between the pointing form and its referent, and instead focuses on the how the form is used within the grammatical system of ASL, the plurifunctionality of pointing may make it difficult to simply bring person points under grammatical control.

2.2.3 Acquisition of personal pronouns in deaf children. The focus of the present study is on the acquisition of personal pronouns, addressing three aspects of this process: (1) the early gestural use of pointing to index self and others; (2) the later linguistic use of pointing to represent personal pronouns; and (3) the relationship between pointing to reference people and the child's class of early deictic pointing gestures. To date, there exist few studies of very early language acquisition in deaf children (Petitto, 1980, 1982; Pizzuto, Note 1), and with the exception of the present study, none which address the issues raised in the introduction. Instead, there are detailed accounts of the child's acquisition of "phonology" (i.e., stages of manual

articulation; e.g., Petitto, 1979; McIntire, 1977), acquisition of complex verb morphology (Fischer, 1973; Meier, 1982; Petitto, 1981; Supalla, 1982), development of grammatical and semantic categories (Launer, 1982; Newport & Ashbrook, 1977), and studies of later acquisition of pronominal and anaphoric referencing (Bellugi and Klima, 1980; Hoffmeister, 1978; Kantor, 1982; Loew, 1980, Petitto, 1977, 1981; Pizzuto and Williams, 1980). These important studies have established that despite the differences in modality, deaf children acquire ASL as a first language in ways that are similar to those of hearing children acquiring spoken language.

In the course of seeking evidence for "modality-free" linguistic universals, many of the earlier studies emphasized the similarities between deaf and hearing children's acquisition of surface linguistic forms, and focussed primarily on later language development. Whether deaf and hearing children's underlying knowledge (i.e., knowledge representation and rules) for using these surface forms is also similar was not addressed. It seems reasonable, however, that when considering issues of linguistic universals, a deeper understanding of the type of underlying knowledge which contributes to the deaf child's acquisition process is also needed. A fruitful strategy in exploring this issue seems to be to investigate that area

where the difference in modality might yield the greatest differences between the acquisition processes of deaf and hearing children, in particular, the deaf child's transition from the earliest use of gestures to linguistic expression (rather than later language development). It is in the deaf child's earliest entry into language that her general cognitive abilities might facilitate acquisition: first, because gestures and symbols reside in a single modality and second, because formational properties of some signs resemble or index objects in the environment. Children learning spoken language, of course, are not faced with this situation; for the most part, the relationship between words and their referents is arbitrary.

Aside from the present study, Pizzuto (Note 1) is the only other researcher to have examined the early communicative gestures of a deaf child acquiring ASL. Pizzuto's subject--the same child used as the second subject (Carla) in the present study--was a congenitally deaf child followed from ages 8-29 months. Pizzuto investigated the child's early deictic gestures and how they evolved into deictic signs.

Pizzuto's study differs from the present study in several important ways. First, Pizzuto concentrated primarily on those pointing forms that eventually signalled demonstrative and locative pronouns, rather than on personal

pronouns. In studying these particular pronouns, Pizzuto observed that from 12-20 months the child used demonstrative pronouns first, and then she used demonstrative and locative pronouns both alone and in combination with other signs. It was not, however, until 20 months that the first occurrence of pronouns appeared (i.e., the child produced ME), which was followed by the appearance of second and third person pronouns in later months. Thus, although the child pointed to objects and locations earlier, she did not use the pointing form in reference to people. Pizzuto does not address herself to this apparent discontinuity in the child's use of the pointing form. Nor do we know the cause of this absence of person referencing.

Further, there exist theoretical and methodological differences between the two studies. Pizzuto's goal was to demonstrate the similarities between hearing and deaf children by providing descriptions of the deaf child's use of pointing forms, rather than to ask questions about what functions these pointing forms held for the deaf child and what types of knowledge controlled their use. Pizzuto's study also differs in her solution to a methodological problem unique to this type of research: early pointing gestures are formationally similar to demonstratives and locative pronouns in adult ASL. The problem, then, is how to distinguish between the child's early pointing gestures and

her pointing signs. Put another way, how does one evaluate the transition from gesture to symbol when gesture and symbol share the same form? Pizzuto's solution to this problem led to an overinclusive criterion for categorizing pointing behavior in which many gestures were judged erroneously as signs. Pizzuto arbitrarily categorized all pointing forms that occurred in combination with lexical signs as either demonstrative or locative pronouns; pointing alone or in combination with another pointing form was deemed a gesture. Unfortunately, this methodology resulted in the attribution of adult-like grammatical and semantic knowledge to the very young child based primarily on the experimenter's judgment as to the pointing forms' contextual appropriateness. Whether this methodology yielded an accurate assessment of what the child knew is an open question. (An alternative method is proposed in Chapter 3, section 3.2.3.)

Petitto (1980) analyzed the pre-linguistic communicative skills of one congenitally deaf girl (at ages 6 and 10 months) who was learning ASL as a first language. The child's gestures, their contexts of occurrence and the mother's responses were analyzed. One significant finding was that the deaf child used pointing gestures at 10 months which were of precisely the same type found in hearing children at this age, a fact which had not been previously noted. As has been observed in hearing children by Werner

and Kaplan (1963), Bates et al. (1975), and others, this deaf child used the pointing gesture in two ways: denotative pointing with communicative intent (child points towards object, looks to mother, looks to locus of the pointing gesture, looks back to seek mother's gaze), and pointing toward objects without seeking mother's gaze. The most interesting finding, however, was that this child produced unambiguous pointing to herself (resembling ME) and to others (resembling YOU), both alone and in combination with the other pointing gestures described above. This finding was particularly striking because hearing children have not been observed to use pointing in self reference until the time of their first pronouns, around 18 months, and these pointing forms almost always accompany the verbal pronoun (Bates, personal communication). Because previous research with hearing children (both developmental and linguistic) had suggested that it was unlikely that children at this age could engage in symbolic self-other referencing, the deaf child's performance raised important questions about the basis for her pointing to self and others. Her performance also raised the possibility that her ability to engage in this behavior had been facilitated by the fact that the means to express person reference in ASL was of the same form as her pre-linguistic communicative gestures, namely the pointing form. It was the deaf child's early use of the

pointing form to herself and other people that was the impetus behind the present study. This pilot research demonstrated the occurrence of an usual pointing behavior; the present study was designed to evaluate how the child moves from this use of pointing to the linguistic expression of personal pronouns in ASL.

2.3 Summary of Theoretical Issues with Respect to the Acquisition of Pronouns in ASL

The hearing child acquiring the use of pronouns faces a somewhat different problem from the deaf child. The pronouns which largely supercede pre-linguistic pointing gestures in spoken language involve a change in modality. In contrast, the deaf child's pronominal pointing is very similar in form to pre-linguistic gestures; the child's task is to learn the grammatical conventions governing the pointing form, and to integrate the use of pronominal pointing with other aspects of the language, and with paralinguistic deictic pointing.

In asking questions about the child's underlying knowledge and how it changes over time, several predictions can be made with respect to the two major accounts of language acquisition presented earlier: If language is merely built up from early pre-linguistic communicative competence, there will be a smooth and direct transition from

the deaf child's gestural pointing to the linguistic use of YOU and ME pronoun pointing. If, however, language is a distinct capacity, not wholly built up from early communicative competence, acquiring the language might interfere with the integrity of pointing gestures as they become part of a rule-governed linguistic system. Here we might expect to find evidence for the reorganization of the child's knowledge structures, entailing a reformulation of the function and use of pointing.

Given that the symbolic expression of person pronouns in ASL is of the same form as simple non-linguistic pointing common to hearing and deaf adults and pre-linguistic children, the following specific questions will be addressed: First, how do early pointing gestures come under grammatical control? That is, how does the child move from the early biologically-given, unconstrained and communicative use of pointing gestures to the use of pronominal pointing constrained by the grammatical conventions of the language? Second, does the child actively construct hypotheses about the meaning of the pointing gestures, or are the meanings so transparent as to render them effortless to learn? Here the question is whether the acquisition of linguistically-governed pointing is facilitated by the child's knowledge of its extra-linguistic communicative functions. In other words, what is the developmental

relationship between pre-linguistic communicative gestures and linguistic expression? Finally, given the seemingly transparent meaning of YOU and ME pronouns in ASL, will deaf children learn these relations at an accelerated rate? Some hearing children are still sorting out the meaning of the you and me forms as late as 2;6; this prolonged acquisition process may be truncated for deaf children because of the similarity between pre-linguistic and pronominal pointing and may be acquired in an error-free manner.

Footnotes for Chapter 2

1. The different strategies that some children employ in forming multi-word utterances has led to a distinction between "pronominal style" and "nominal style" children (Bloom, Lightbown & Hood, 1975; see also Bates et al., 1979, for a review of this literature). Some children's early multi-word speech contain a predominance of first person pronouns with verbs (so-called nominal children). As development proceeds the children who began with nominal strategies learned the relevant pronoun forms and the children who began with a pronominal strategy learned noun forms (the "nominal/pronominal shift"). When MLU reached 2;5, this difference went away and children knew it was possible to combine nouns and pronouns with verbs. What this research (based on production data) can tell us about the child's acquisition of pronouns is unclear, however, because even those children with a MLU of 2.5 used nouns and pronouns in ways that were neither contextually nor syntactically relevant. For example, a child might use a noun in contexts where the referent was completely obvious and a pronoun in contexts where the referent was unclear or unknown. The authors concluded that there was no evidence that the children knew the rules for the "alternative use" of the different noun and pronoun forms even though they had acquired them (Bloom, Lightbown, & Hood, 1975; see also Huxley, 1970; Nelson, 1975).

2. The sign illustrations in this dissertation were drawn by Frank Paul; I thank him for his expert work.

CHAPTER 3: METHOD

3.1 Subjects

The subjects of the study were two profoundly and congenitally deaf girls who were learning ASL as a first language from their deaf parents. Access to the children was obtained through The Salk Institute for Biological Studies, Laboratory for Language and Cognitive Studies, under the aegis of Dr. Ursula Bellugi. The children were of normal intelligence and were free of other neurological and physical handicaps.

The parents of the first child, called Kate, attended Gallaudet College for the Deaf (in Washington D.C.), and teach (in ASL) at a deaf high school in northern California. The parents of second child, called Carla, were graduated from residential high schools for the deaf.[1] Mother cared for Carla and her congenitally deaf sister, Jane, (who was 2;4 years older than Carla) at home and was not employed; father worked as a printer. Both families were active members of the deaf community in their respective towns in northern California and their children interacted with other deaf children. The children's communicative interaction with adults, including those between the first child, Kate, and myself, were conducted exclusively in ASL.

Two factors are noteworthy with respect to finding

subjects for this type of research: (a) scarcity of subjects and (b) social constraints on access to the deaf community by a hearing researcher. Ideally, when studying acquisition issues in signed languages, one studies "normal" deaf children who are learning sign language from their deaf parents as a native language without any interference from the spoken majority language. This population, however, is extremely small. Of the estimated 500,000 deaf people in the United States, only 9% of them were born to deaf parents (Schein & Delk, 1974). Holding aside issues such as degree of hearing loss and age of onset, the percentage of this group of deaf people (born to deaf parents) who (a) are married to other deaf persons, (b) have profoundly deaf children (rather than hearing or hard-of-hearing children and (c) use ASL in the home as the primary means of communication comprises an even smaller group (Schein & Delk, 1974). In fact, this population is quite rare. A second factor that makes obtaining young deaf subjects problematic is that there exists a cultural taboo within the deaf community about participating in research, especially with hearing researchers. Better access can be obtained if the hearing researcher is able to communicate with deaf parents in their native language (i.e., in ASL rather than an invented sign code such as Signed English--the system most commonly used by hearing signers). This represents a "Catch-22" situation,

insofar as access to the community is required in order to learn the language in the first place. As a result, only a handful of hearing researchers can actually do this type of research.[2]

3.2 Procedure

3.2.1 Data base. Two types of data were obtained in this study: naturalistic and experimental. For Kate, naturalistic data were obtained from ages 6 months to 3;7 and experimental data from 2 pronoun elicitation tasks--one at age 1;11 and one at 2;11. Only data between 6 months and 2 years, 3 months are reported in this study. For Carla, naturalistic data were obtained from ages 8 months to 4;9. Only data between ages 8 months and 2 years, 3 months are reported in this study (see Table 1; Videotape 10a for Kate represents the experimental taping session; Videotape #10 for Carla was transcribed for pronouns exclusively).

(1) Naturalistic data for Kate and Carla: Kate was videotaped for 12 one hour sessions in free conversation at home (and on occasion in a studio-playroom in the Bellugi Laboratory) with her mother (and, less often, with her father). When in the Bellugi Lab, mother and child were videotaped by a deaf researcher, or myself. When at home, mother and child were videotaped either by the mother herself (with camera aimed at a particular area, mother and child

KATE

VIDEOTAPE NUMBER	LENGTH (MINUTES)	AGE (MONTHS, DAYS)		NUMBER OF UTTERANCES
1	35	6	(17)	----
2	45	10	(10)	95
3	30	12	(9)	24
5	30	15	(4)	49
7	30	18	(0)	135
9	30	22	(12)	50
10	30	23	(8)	59
10a	60	23	(12)	106
12	30	27	(4)	95

CARLA

VIDEOTAPE NUMBER	LENGTH (MINUTES)	AGE (MONTHS, DAYS)		NUMBER OF UTTERANCES
0	30	8	(4)	----
1A	30	12	(7)	52
1B	30	15	(8)	24
1	30	18	(0)	77
5	30	21	(8)	87
7	30	23	(16)	209
8	30	25	(11)	160
10	30	27	(11)	*

TABLE 1
Summary of Data Samples for Kate and Carla

would remain in that area and converse), by the father, or by myself. No more than 2 adults were present during a taping session. The child was videotaped approximately once every one and a half months with two exceptions: one 4 month interval (between taping sessions 1 and 2), and one 3 month interval (between taping sessions 11 and 12).

Carla was videotaped for 12 one hour taping sessions in free conversation at home with her mother (and at times, with her sister, Jane). Mother and children were videotaped by a deaf researcher (and on occasion, by two deaf researchers); no more than 3 adults were present during a taping session. The child was videotaped approximately once every month with three exceptions: one 4 month interval (between taping sessions 0 and 1-A), one 3 month interval (between taping sessions 1-A and 1-B), and one 2 month interval (between taping sessions 7 and 8).

(2) Experimental data for Kate: At age 1;11 Kate's production of personal pronouns was formally evaluated with a series of pronoun elicitation tasks (taping session 10a on Table 1). The goal of the experimental tasks was to establish a structured environment in which Kate would be likely to produce YOU and/or ME (and third person pronouns) if she knew them. Further, contexts were established where Kate's comprehension of YOU and ME pronouns could be unambiguously inferred. The tasks were adapted from those

used with hearing children by Charney (1978) and Chiat (1981); Pizzuto and Williams (1980) used a related version of Charney's tasks to test possessives in ASL. The child was first pre-tested with a series of pictures of common objects to establish her ability to recognize and identify referents in them. Second, three pronoun tasks were administered and involved (a) photographs of familiar and unfamiliar people (including the experimenter, child and her parents); (b) an action task involving a bag filled with family possessions and (c) a hiding-box task where the child had to find grapes under a specified picture. During each task Kate was asked a series of questions to encourage her production of personal pronouns and to determine her comprehension of proper nouns (and where possible, pronouns).

(a) Task 1 Picture Identification Task (7 test items)- In this task the child was shown, for example, a picture of herself and asked in ASL "Who's this?" or "Where is this person?". Photos were shown to the child one at a time and were discussed by mother or experimenter until Kate identified the people in them (or until she seemed unable to do so). It was believed that the child would either use proper nouns or pronouns in response to such questions if she knew them.

(b) Task 2 Action Task (14 test items)- In this task Kate was presented with an object and asked to identify it.

Next, the experimenter (or mother) would ask Kate, for example, "Whose brush is this?", instruct her to "Brush mommy's hair", or playfully misattribute ownership so as to encourage her to correctly identify ownership or to stimulate her to ask to have (or see) it. In general, each test item was drawn from a bag and shown once to the child. After conversing with Kate about a particular test item, it was gently removed from her sight and another test item was introduced in its place. Given Kate's young age, it was often necessary to permit her to hold and touch the items before taking them away. In general, however, Kate had access to only one test item at a time.

Tasks 1 and 2 yielded a corpus of utterances whose content was analyzed for the distribution and frequency of Kate's use of pronouns.

(c) Task 3 Hiding-Box Task (5 photos, 8 trials)- In this task three pictures (e.g., one of mother, child and experimenter) were taped onto boxes and placed in front of the child; a cloth was used to cover the pictures while a grape was placed under one of them. The child's task was to choose the correct picture after being instructed that the grape was under either MOTHER, LAURA, or KATE's picture, or that the grape was under either ME, YOU, or HER. Two speaker conditions were also included as part of the task design: whether the speaker was mother or the experimenter. In

designing this comprehension task it was understood that the specific form of pronouns in ASL would prevent one from unambiguously concluding that the child understood the pointing form as a pronoun, rather than a general deitic pointing gesture. That is, it would be impossible to determine on all trials whether the child performed the task correctly because she genuinely comprehended YOU and ME pronouns, or because she was cued as to what to do based on the extra-linguistic context and indexical nature of pointing gestures. In testing comprehension, both Charney and Chiat told hearing children, for example, that "The raisin is under the picture of me" or "The raisin is under the picture of you", making certain not to accompany the verbal utterance with self and other pointing gestures which they believed cued a correct response. In Task 1, for example, this problem could be circumvented by showing the child a picture of herself and asking her "Who is this?". Here, the child's signed response, ME, would be scored as correct, and the experimenter could not have cued the response. In this comprehension task, however, the possibility of cueing could not be ruled out. Nonetheless, this task was designed to be used with Kate for the following two reasons. The first and most important reason was that I did not want to pre-judge the child's ability to do the task. That is, I did not want to make any a priori assumptions that Kate could (or could

not) do the task. I believed, instead, that the task might potentially reveal errors in comprehension which would not have been uncovered otherwise. Indeed, an unusual and unexpected comprehension error did emerge as a result of this experimental task. Second, it was hoped that the results from this task would serve as an important basis for comparison with those results obtained for hearing children.

3.2.2 Data analysis: transcription procedures. All the tapes between 6 months and 2;3 for Kate and 8 months and 2;3 for Carla, were viewed, and the data to be presented are from a sub-set of 8 naturalistic tapes for each child (with a mean interval of 3 months for Kate, and 2.7 months for Carla). In addition, one videotape of the pronoun elicitation tasks conducted with Kate at age 1;11 was selected for analysis. Tape selection was governed by pragmatic considerations; videotape transcription time for Kate's nine tapes alone was in excess of 500 hours. In addition, reliability checks on the transcriptions of eight videotapes (four for Kate and four for Carla) were done by two native deaf signers whose own judgments showed 95% agreement with my own. The tape transcription consisted of an analysis of both the adult and child's signing and included detailed contextual information. Coding for the signed utterances consisted of nine channels of information per frame per person: with mother and child always on screen

that yielded 18 channels of encoding per frame. These channels included linguistically relevant information concerning the nature of eye gaze, head movements, body shifts, manual signs, non-manual grammatical facial markers including brow and mouth movements, spatial indexing, aspectual modulations of movement on signs, the path-movement of ASL verbs of motion (verb-agreement system) and "phonological" (formational) sign variation.[3]

Contextual information was also noted including information on conversational turns, conversational topics, the child's topic initiating and topic terminating devices, her symbolic play, and other information about the mother-child social interactions (e.g. child's distress at mother's departure and subsequent reaction upon mother's return).

Table 2 provides an example of the transcription system used in this study.[4] Briefly, the general organization of the transcript was as follows: signs were "stripped" of all grammatical markings (e.g., modulations of movement and space), assigned the English gloss which most closely matched the sign's meaning and placed onto the "sign-line" in capital letters (i.e., ASL SIGN GLOSS in Table 2). All grammatical markings were notated separately above the sign-line to the right of the sign gloss. In this sample transcript, for example, +QF (utterance 30) indicates that the obligatory

1. **Transcript Organization**

```
                [-Grammatical Notation-]
ASL SIGN GLOSS
                [-Formational Notation-]
English Translation
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2. **Sample Transcript (VT #12, Age: 2;3)**

CHILD	MOTHER
29a. [Holds up letter "S" to M] [EG:K→M]	
	30. WHO-/ [+QF;EG:M→K]
31. -S- (Pt:oss,loc) [EG:X3→2, ] BABY/ [EG:K→M]	
(=Baby Svenna is overthere.)	
	32. 'BACK' [+AffHd] BABY/ [+AffHd;EG:M→K]
	[A~]
	(=Yes, the baby is back there.)
33. -S- -/ [EG:K→M]	--- 34. -S- YOUR SISTER/ [X:1→2] [EG:M→K]
	(= Svenna is your sister.)
35. SWEET SISTER/ [+AffHd;EG:K→M]	
(=She is a sweet sister.)	
	36. SWEET YES, [+AffHd] NOW WHERE NOW WHERE, [EG:X3→X2,+QF]
	NOW WHERE/ [+Qf;EG:M→K]
	(=Yes, she's sweet. Where is she now?)
37. HOME WHERE HOME (Pt:ss,obj-C letter "S")/ [EG:K→M→RHd]	
[LfHd]	
(=She's home)	
	38. [NEGHD] (Pt: PRO 1) MEAN -S- DO-DO [D]
	NOW WHAT/ [+QF;EG:M→K] [Looks to S's room] -S- WHAT,
	AWAKE QM/ [+QF;EG:M→K] NO [NegHd] -S- SLEEP/ [EG:M→K]
	(= No, I mean what is she doing now? Is she awake? No, Svenna is sleeping.)

TABLE 2

Summary of Transcription Format

question facial marker in ASL was used concurrently with the manual question sign WHO. The notation +EG provides information about the direction of the signer's eye gaze, and +AffHD and NegHD above the sign-line indicate that affirmative or negative head movements accompanied the manual sign. When these head movements occur alone (e.g., utterance 38), they are placed on the sign-line (and are considered to have full lexical status, although they are non-manual). A particularly important notation is X: (plus arrow or diagram) which provides information about the path of the signer's gaze, the path-movement of verbs in ASL (i.e., verb agreement system), or the spatial index of a sign in the signing space (as in the direction of the child's pointing). A slash (/) indicates a signer's completed utterance, whereas a hyphen and a slash (-/) indicates that the signer's utterance was interrupted or "cut-off" by the addressee. The child and adult's pointing gestures were abbreviated as Pt: and appear in parentheses with information about its formation and goal. In utterance 31, for example, the notation (Pt:oss,loc), indicates that the child pointed out of her own signing space (or "oss") rather than within her signing space (or "ss"), and pointed towards a location (or "loc") rather than at an object (or "obj"). Only marked (as opposed to unmarked) sign formations (or the child's "phonological" deviations) were noted in the line beneath the

sign-line. Finally, utterances were numbered, and English translations were provided beneath all of the above.

3.2.3 Data analysis: coding procedures. In addition to the above information, every utterance containing a pointing form was extracted from each child's corpus and classified in the following ways:

(1) Manner of deictic pointing to objects and locations: Petitto (1977) and Hoffmeister (1978) observed that deaf children progress from pointing on objects, often leaving the signing space to do so, to more adult-like pointing towards objects and locations within the linguistic constraints of the signer's signing space. In this study, therefore, these distinctions were coded: +contact was used for pointing on objects, while -contact was used to indicate pointing which was directed towards objects without physically contacting them. Contextual information permitting, an attempt was made to differentiate the child's pointing to locations from her pointing to distant objects. Finally, special care was taken to indicate the direction of the child's eye gaze and whether the pointing form and arm extended outside of or within the signing space. This method of classification made it possible to observe the change in frequency and distribution of the child's object and location pointing forms over time.[5]

(2) Manner of pointing to self and others: The direction of the child's eye gaze, and contextual information both

before and after using the pointing form to self and other people were noted. This was particularly important in the child's very early use of the pointing form to self and other people. Because the child's general deictic pointing forms (to objects and locations) resemble second and third person referencing, the formation and use of the child's pointing form (and accompanying eye gaze) to other people was examined carefully. Specifically, it was observed whether the formation of the child's YOU was identical to the child's general deictic pointing. This method made it possible to determine the frequency and distribution of particular pronoun pointing forms. The objective of the analysis was to determine the child's underlying knowledge or generalizations about the pointing forms used in person referencing. Of greatest interest were the child's systematic pronoun errors. If pointing forms were always used appropriately, we could not be certain that the child regarded the pointing used in person referencing as belonging to a distinct grammatical class from that of the pointing used in general deictic referencing to objects and locations. On the other hand, where person distinctions are marked incorrectly, it is possible to infer the child's underlying generalizations. In particular, if the child's errors regarding a particular person distinction were consistent, it could be inferred that the distinction was outside of the child's competence.

Finally, mother's use of pointing forms were analyzed in a manner similar to that described above for the child.

3.3 Summary of Procedure

Nine videotapes were transcribed for Kate: 8 naturalistic sessions and 1 experimental session; eight naturalistic videotapes were transcribed for Carla. Several categories of pointing forms were analyzed for Kate and Carla, as well as for their mothers. In addition, general measures of the children's language development were assessed which included sign and combination growth, and developmental increments in their MLU. Frequency and distribution counts were determined for each category and percentages were calculated and graphed. Three pronoun elicitation tasks were administered to Kate to evaluate her production and comprehension of personal pronouns. Finally, general measures of discourse, cognitive, semantic and social devlopment were informally assessed for each child.

Footnotes for Chapter 3

1. Carla is referred to as Corinne in other reports on aspects of her language development (e.g., Launer, 1982, acquisition of nouns and verbs; Loew, 1983, acquisition of narratives, referencing and anaphora; Meier, 1982, acquisition of verb morphology).

2. There are, of course, deaf researchers who are engaged in developmental psycholinguistic research who do not have this particular problem.

3. Carla's mother's utterances were transcribed exclusively for pronouns.

4. Much of this transcription system was developed by myself in 1973 to notate the signed utterances of Nim Chimpsky (Terrace, Petitto, & Bever, 1976, 1977) and was based upon Lois Bloom's notational system used for hearing children (Bloom, personal communication). Once I joined the Bellugi Laboratory in 1976 to study deaf children, however, this system had to be modified because of the much greater richness of the child's behavior. Specifically, Ursula Bellugi's important analysis and notation for ASL's grammatical structure were subsequently added to my original transcription system.

5. Although this study was not addressing issues concerning the child's acquisition of demonstrative and locative pronouns, it appears that the child's ability to bring the pointing form within the signing space without contacting the referent is a better determinant of the emerging linguistic status of these early deictic pointing gestures rather than the criteria proposed earlier by Pizzuto (Note 1). It will be recalled that in Pizzuto's classification system all pointing gestures that occurred with a lexical sign were considered a full sign in ASL and further categorized as demonstrative or locative pronouns depending on the experimenter's assessment of the contextual information.

CHAPTER 4: RESULTS, CHILD ONE

Kate's acquisition of personal pronouns will be discussed in this chapter and Carla's results will be discussed in the following chapter (Chapter 5). Within this chapter, Kate's naturalistic data will be discussed first, followed by the results of the pronoun elicitation tasks. Several distinct developments marked Kate's acquisition of personal pronouns.

4.1 Early Period: Ages 6 and 10 Months

At 6 months Kate did not point, but did show the normal reaching and grasping behaviors that are typical of hearing children at this age. At 10 months a vastly different behavioral pattern emerged. Here Kate used pointing gestures quite freely. She pointed to things around her, at times to direct mother's attention to objects (total=57) or to distant objects and locations (total=19), moving her eye gaze from mother to the locus of her pointing form and back to mother.

At other times, Kate used the pointing gesture to poke at objects and investigate them (total=20), moving her eye gaze from her own hand to the object rather than seeking mother's eye gaze. Included in Kate's pointing gestures were 12 unambiguous points directed to herself (center of chest) and 7 to other people (facial region or upper trunk). This yielded a total of 115 tokens of pointing gestures in one 45 minute videotape session.

Kate's use of pointing to people was similar to her use of other communicative pointing gestures; she pointed to persons in motion around the room or to salient objects on their bodies (e.g., a person's hat), and made eye contact with them. One noteworthy use of this gesture was Kate's prolonged pointing to unfamiliar adults. On two occasions, Kate held her index finger toward a previously unknown person's face for nearly a minute, keeping her gaze fixed on the person's eyes. Further, on several occasions, her hand remained in a particular pointing posture (raised forearm, bent at the elbow with index finger directed towards the ceiling), while there appeared to be no apparent denotative or communicative goal. This "resting-state" pointing posture has, to my knowledge, not been previously reported in the literature for hearing children.

Kate's 12 pointing gestures to herself occurred in combination with other pointing gestures. Except for one

example in which her pointing followed mother's utterance, "YOU KATE", the instances of pointing gestures to herself in the corpus were spontaneous. Pointing to herself did not always involve eye gaze with an adult; instead Kate generally (a) pointed at an object (b) pointed to herself (or vice versa) with eye gaze fixed on the object and then (c) looked to the adult, often followed by some action to obtain the object. For example, while looking at her own image in a mirror, Kate pointed to the image and then pointed to her chest (as in ME). While playing alone, Kate tried to pull her toy dog loose from a pile of objects and failed; then she reached for her toy duck and failed again. Finally, with eyes fixed on the dog, Kate pointed to it, pointed to her own chest (as in ME) and turned her body around appearing to search for mother's aid. (Another participant noticed this event and quickly gave her the dog.) On another occasion, when two stuffed dogs were held out in front of her, she (a) moved her eyes from one to the other, (b) pointed to her own chest, as in ME--with eyes fixed on the dog to the right, (c) immediately contacted the dog on the right with a second pointing gesture, and (d) looked to the researcher holding the dogs. Thus, it appeared that Kate was indicating which dog she preferred of the two that were offered to her. A final example involved pointing to a body part rather than self. Although this gesture was not included within the

"pointing to self" count, it is noteworthy nonetheless. A Big Bird puppet was held out in front of the child. She laughed and grasped at it and seemed captivated by its nose. After several moments of fixed eye gaze, Kate pointed to Big Bird's nose and then pointed at her own nose.

Exactly what the child intended by her pointing gestures to self and other people, or what the child knew when she used these early pointing gestures are unknown. The examples suggest, however, that Kate recognized herself as distinct from others, or at least, that such knowledge was emerging at this time. Kate's pointing gestures had a powerful pragmatic consequence in that mother and other adults immediately supplied the name of the referents that the child pointed towards. However, Kate did not always look to adults at these times which suggests that the child had not yet fully made the connection between her own pointing form and its naming function. What the child did do quite reliably, however, was to respond appropriately to adults' deictic pointing; Kate almost always looked to the exact locus of an adult's pointing form. There was one noteworthy exception: when adults pointed to Kate (as in YOU) or to themselves (as in ME) she looked directly to the adult's hand itself. This contrasts with adult ASL in which eye gaze is fixed on the signer's face. Finally, the deaf child pointed to herself at an age when hearing children apparently do not point to

themselves. This behavior may have occurred in the very young deaf child because of its specific indexical form and because of its central role in ASL.

Table 3 summarizes Kate's early communicative behavior. To review, Kate did not use pointing gestures at six months, but did use them at ten months, pointing to objects, places and people in a communicative fashion.

4.2 Middle Period: Ages 12 to 18 Months

Between the ages of 12 and 18 months a series of changes occurred in Kate's language. Beginning around 12 months and continuing through 18 months, one semantic function of Kate's pointing gestures disappeared completely from her lexicon. Surprisingly, Kate stopped using pointing forms to herself, mother, father, and other people. At the same time, she continued to use pointing forms to denote objects, locations, and events around her. That is, the child stopped pointing to refer to people, but continued to use pointing for general deictic referencing.

Figure 2 represents the percentage of Kate's total number of pointing forms per session which were directed to herself and to other people (labelled "self" and "addressee" on figures, respectively; most all conversational participants with Kate occupied the addressee role for her). Figures 3 and 4 represent the relationship between Kate's use

AGE	CHARACTERISTICS OF EARLY COMMUNICATIVE BEHAVIOR
6 months	-no pointing, no signing -reaching, grasping behavior -little fixed eye gaze with mother
10 months	-much pointing (115 in 45 mins.) to objects, places, and people (12 self, 7 other person) -pointing in (pt. + pt.) combinations (26) -pointing function: exploratory/denotive (± intent, ± recipient) -increased eye gaze with mother, tracks people with eye gaze alone -clear attempts to imitate signs

TABLE 3

Summary of Kate's Communicative Behavior
at six and ten months

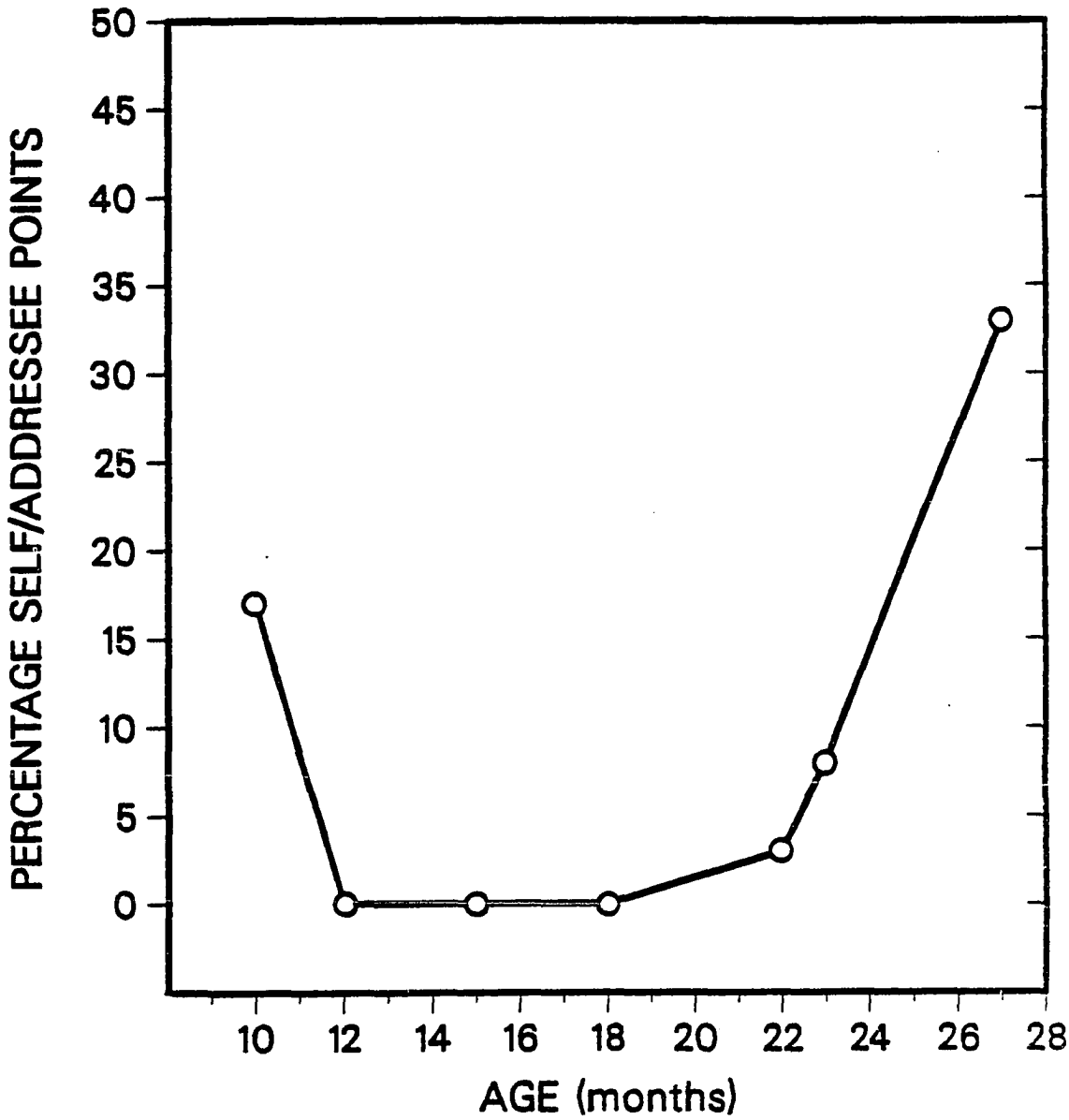


Figure 2.
Percentage of Kate's Total Number of Pointing Forms Directed to Self and Addressee

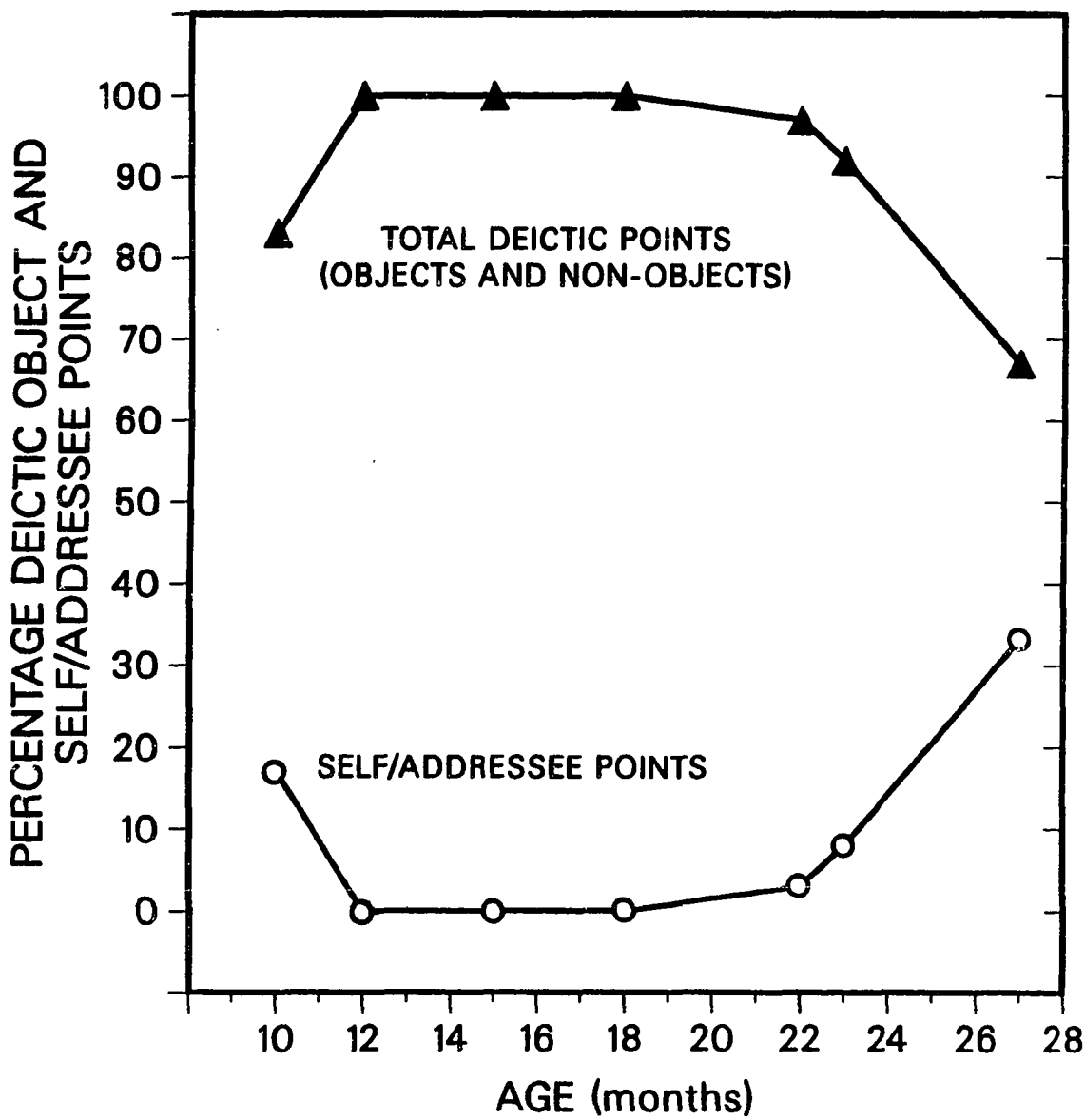


Figure 3.
Relationship Between Kate's Total Use of Deictic Pointing and Pointing to Self and Addressee

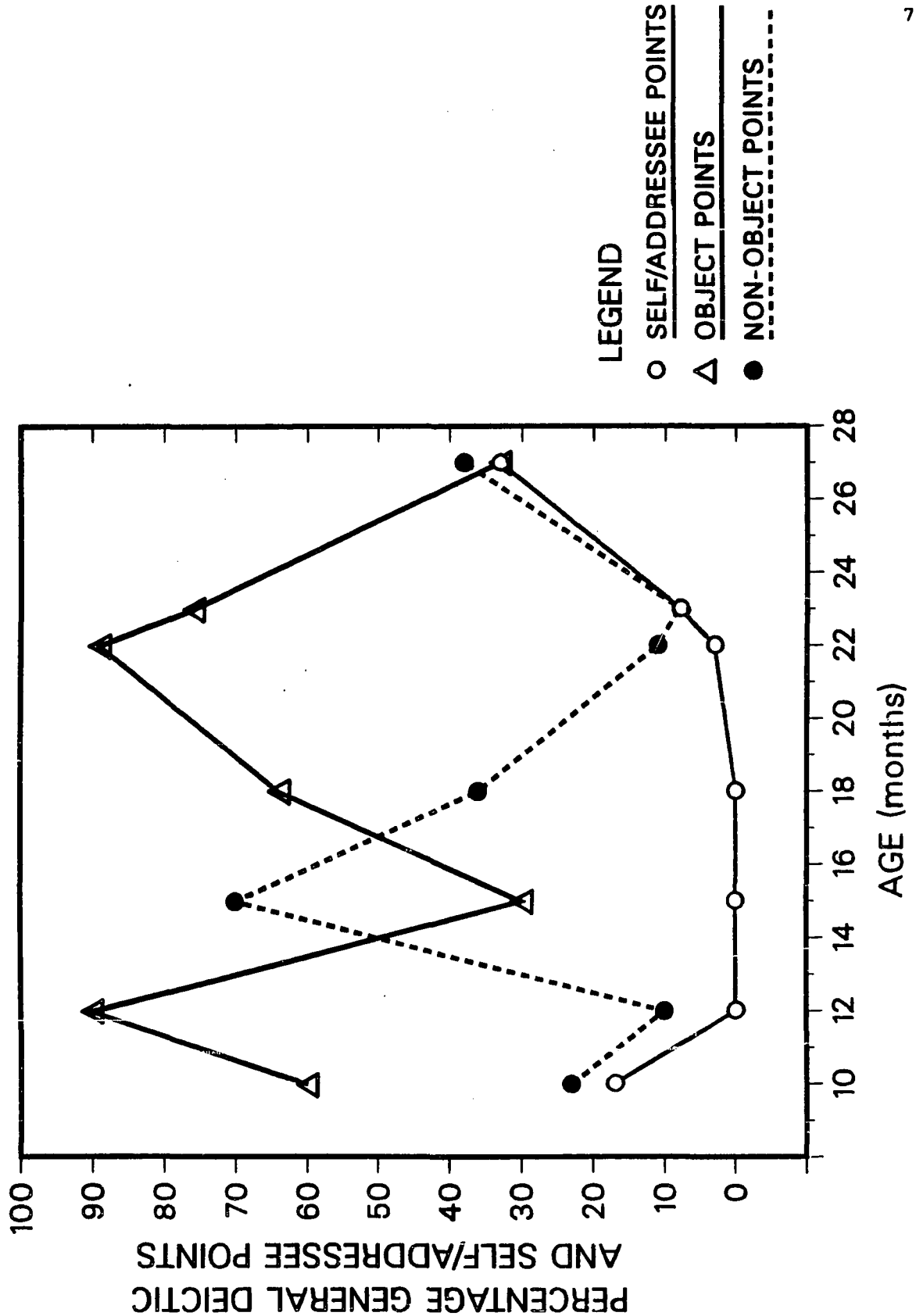


Figure 4.

Relationship Between Kate's Pointing to Objects and Non-Objects and Pointing to Self and Addressee

of the pointing form to self or addressee and her use of general deictic pointing forms to denote objects and locations (labelled "non-objects" on figures) over time. As these figures indicate, during the period when Kate stopped pointing to people, her use of other deictic pointing forms remained abundant and varied. Upon observing Kate's seemingly selective avoidance of a particular function of the indexical pointing form, several types of data were obtained to determine if the absence of self-other referencing resulted from a general language deficit. Several standard measures of language development were taken and suggested that Kate was not language delayed; in fact, her language was developing quite normally compared to that of other hearing and deaf children. First, there was an increase over time in sign and combination types (Figure 5). Second, Mean Length of Utterance (or MLU--calculated according to Brown, 1973) steadily increased during the 12 to 18 month period. Because the MLU was developed for spoken rather than signed language, this measure should be regarded only as an approximate index of her linguistic development (see Table 4 and Figure 6). A third index of language development compared the number of signs used alone versus those used in combination. If the child were acquiring the language in a normal manner, the number of signs occurring alone should decrease, while the number of signs occurring in combination should increase;

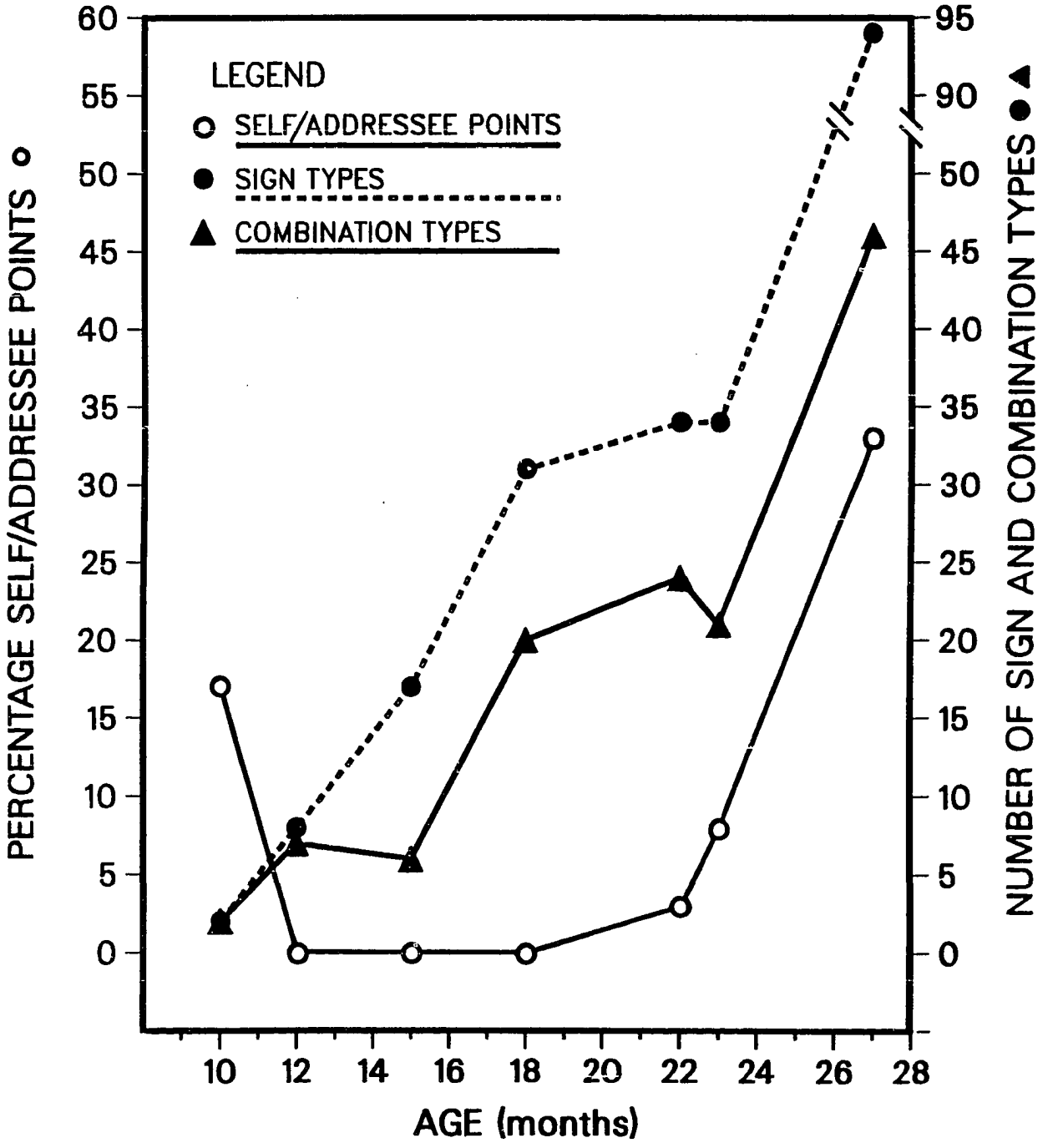


Figure 5.
Kate's Increase in Sign and Combination Types as Compared with Self and Adressee Pointing

NUMBER OF COMBINATION SAMPLES	AGE (MONTHS)	MLU	Sd	MAXIUM LENGTH
5	15	2.0	0	2
6	18	2.50	.55	3
20	22	3.65	1.53	7
15	23	3.86	1.55	8
40	27	3.40	1.37	7

TABLE 4

Kate's Mean Length of Utterance Containing two or more signs

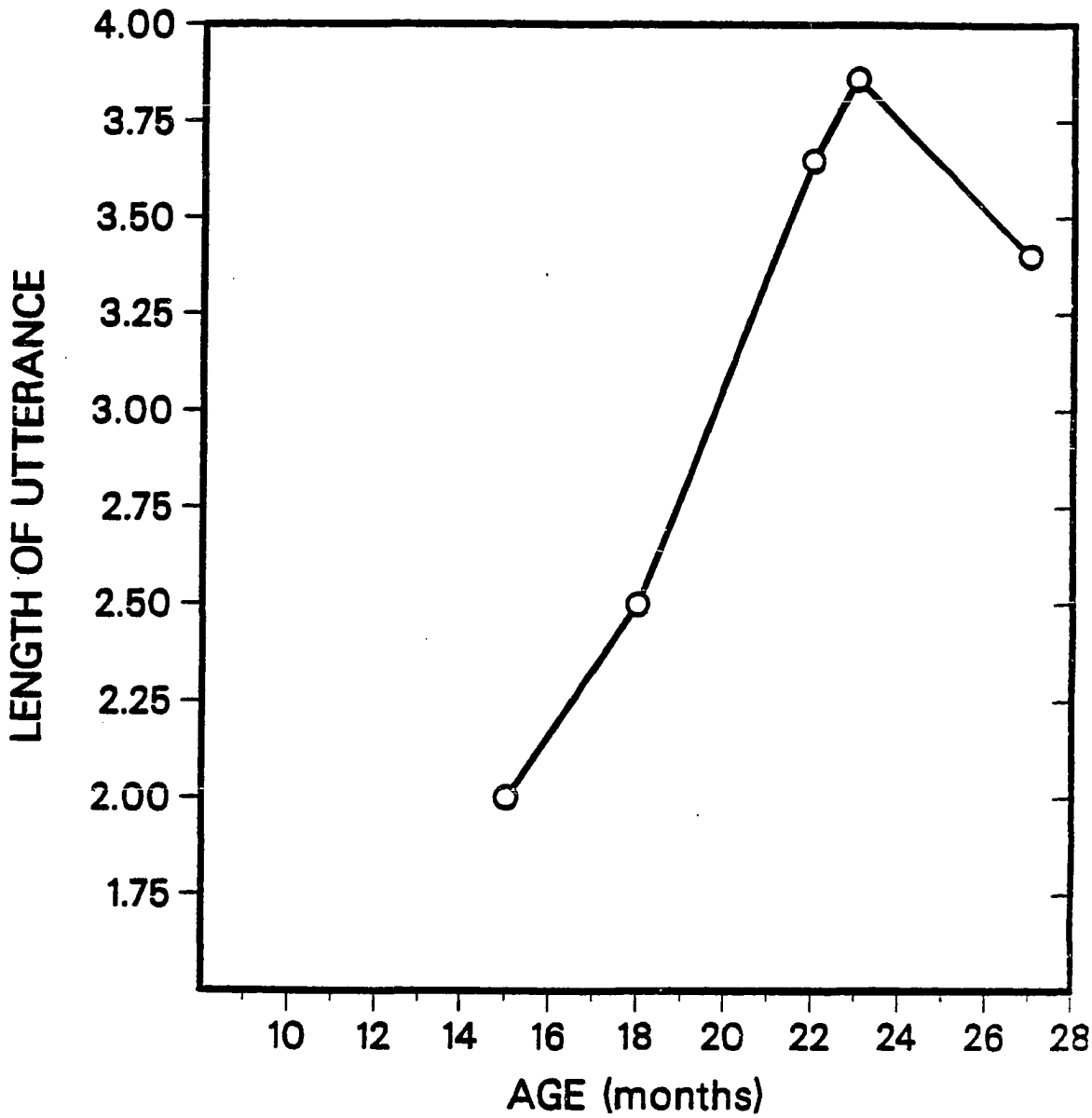


Figure 6.
Kate's Mean Length of Utterance

this is precisely what happened (Figure 7).

In sum, during the 12 to 18 month period when Kate did not point to self or addressee, the child's other markers of language development appeared normal.

The child's referring to herself and other people during the 12 to 18 month period was also examined. Interestingly, Kate referred to people around her by using full proper nouns. She used MOTHER (total=7) and FATHER (total=6) both in contexts that required the second person pronoun YOU or the third person pointing form (gender is not marked in ASL). Despite the fact that third person pointing resembles deictic pointing, Kate did not use general deictic pointing to refer to people during this period, with the exception of three ambiguous instances (out of 83). Although Kate referred to objects and distant locations with the deictic pointing gesture, Kate did not use this form to refer to persons standing in the room, although potentially, she could have; instead she used their names. Finally, the child referred to herself during this period by using the sign GIRL, although infrequently (total=2).

Three other aspects of Kate's language and cognitive development were informally evaluated:

(1) Vocabulary development: Kate's early sign vocabulary was compared to the early word vocabularies reported in the literature for hearing children (e.g.,

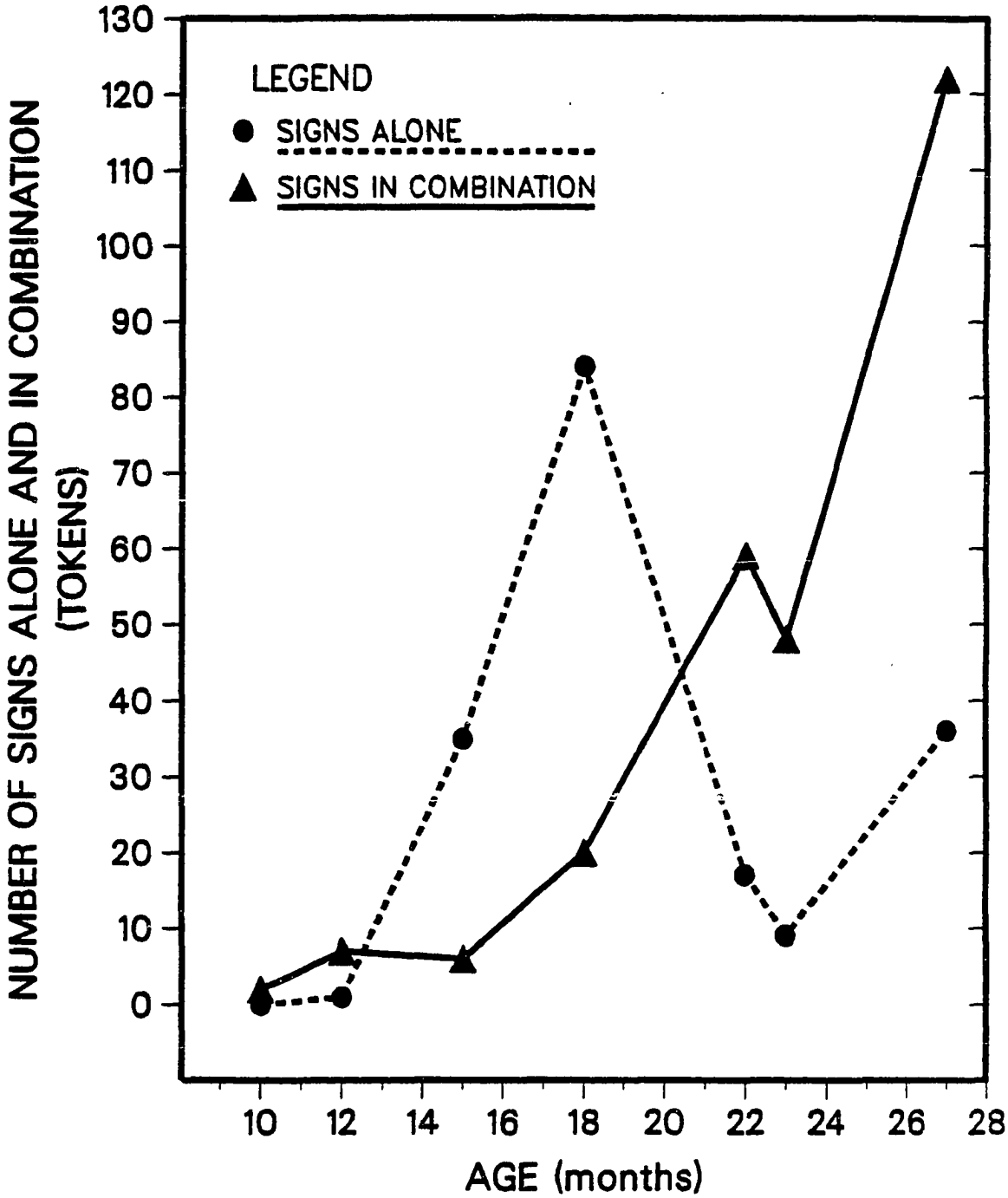


Figure 7.
Kate's Signs Occurring Alone versus Signs in Multi-Sign Combinations

Nelson, 1973; Bloom, 1973) and was found to be similar; the deaf child used her language to communicate about the same sort of things as do hearing children. The deaf child's vocabulary and frequencies of occurrence between ages 12-18 months are presented in Table 5. Note, however, that glosses for the child's deictic pointing forms to indicate objects and locations are not included here, and as a result, this table provides a conservative account of her vocabulary development.

(2) Discourse development: Kate was clearly learning the rules for engaging in ASL discourse as specified by Wilbur and Petitto (1981) and others. By 1;3 she had already demonstrated rudimentary knowledge of ASL conversational rules. Kate had (a) turn-initiating devices (e.g., waving her hand to addressee and seeking eye contact), (b) turn-initiating devices (e.g., lowering hands to neutral sign-space and breaking eye contact) and (c) devices to gain and maintain the conversational floor including ways of interrupting and resisting interruption (e.g., to interrupt, she repeated her utterances until mother attended; to resist interruption, she turned away from mother's gaze while continuing to sign).

(3) Symbolic play: Although mother and child most often conversed over books and meals, on those occasions where Kate played freely with toys her symbolic play appeared

Vocabulary and Frequency of Occurrence
Kate from Ages 12 to 18 Months

12 mths		15 mths		18 mths	
BIRD	1	BOY	1	ALLIGATOR	1
COW	3	COW	1	BABY	1
DOG	1	CEREAL	2	BEAR	1
DUCK	1	CAR/DRIVE	3	BLUSH	1
EAT	3	DOG	4	CANDY	2
FATHER	2	DRINK	1	COMB	2
GIRL	1	EAR	1	CRY	7
MOTHER	1	FATHER	1	DRINK	1
		GOODBYE	1	EARS	3
		HELLO	1	EYES	2
		LIGHT	1	FATHER	3
		MILK	8	GIRAFFE	2
		MOTHER	6	GIRL	1
		NEGHEAD	2	HAIR	1
		WANT	2	HOME	2
		WHERE	3	HISS	3
		WRIST WATCH	5	LION	1
				LIPS	3
				LIPSTICK	2
				MILK	1
				MONKEY	1
				NO	1
				NOSE	1
				PHONE	1
				QUIET	6
				RABBIT	1
				SHOE	2
				SLEEP	1
				WANT	1
				WHAT	7
				WHAT/WRONG	51

Vocabulary and Frequency of Occurrence
Allison at 16 months, 3 weeks (from Bloom, 1973, page 68.)

all gone	1
away	9
baby	19
car	2
chair	14
cookie	15
cow	3
Dada	4
dirty	2
down	22
girl	3
gone	19
here	1
horse	1
Mama	9
mess	2
more	24
no	21
oh	3
pig	6
sit	1
stop	1
there	30
turn	1
uh	2
uh oh	7
up	27
wide	1

TABLE 5
Kate's Vocabulary and Frequencies of Occurrence
Between Ages 12-18 Months

indistinguishable from the profiles provided in the literature for hearing children (e.g., Bates, 1976; Bates et al. 1979). Like hearing children, Kate first played with single objects in a self- involved manner, then combined several objects into basic event schemes (e.g., using a non-standard object--such as a block--to "stand for" a bottle so as to "feed" a doll). At 1;3, Kate played with a stuffed animal as if it were an infant, hugged and rocked it in her arms, and stroked its back as if to comfort it. At 1;6 Kate alternated between feeding a doll imaginary food and describing her actions to mother. At 1;10 Kate engaged in an imaginary conversation with a doll, informing it that she (the doll) was dirty and must have her diaper changed; she then proceeded to change the doll's imaginary diaper and wash the doll with imaginary implements. At 2;3 instead of using objects, either real or imagined, to represent an event, she engaged in a whole-body pantomimic action. In an attempt to tell her father that she had gone ice-skating the day before, Kate signed SKATE, then turned herself around entirely with excitement.

Finally, the mother's utterances were examined to determine whether she avoided using YOU and ME pronouns in an attempt to simplify her utterances to the child. This was not the case. Instead, the mother used full YOU and ME pronouns in syntactic contexts that permitted these to be

optionally marked on ASL verbs of motion. When signed to an adult, pronoun pointing forms are generally incorporated into the path movement of the verb in front of the signer's body. For example, the utterance "I give to you" is signed in ASL by moving the verb GIVE from the signer to the addressee. Here the path of the sign's movement is said to convey the grammatical arguments of first and second person. If both first and second pronouns were to be added to the verb's path movement, the utterance would be ungrammatical. However, in certain syntactic contexts, it is permissible to add one pronoun, resulting in a redundant (and somewhat verbose) utterance, but grammatical nonetheless; this was the nature of mother's sign modifications. Thus, while appearing to engage in a form of motherese, the mother actually signed YOU and ME more during this period.

4.2.1 Summary of child's use of pointing forms during the middle period. Out of the 308 utterances signed by Kate during the taped sessions between 12 and 18 months, there was not a single occurrence of the YOU or ME pronoun points. It appeared, then, that a selective function of the pointing form dropped out, while deictic points remained. Although the overall frequency of deictic pointing decreased over time, the functions of general deictic pointing actually increased during this period, from a purely denotive, communicative function to use in requesting the names of

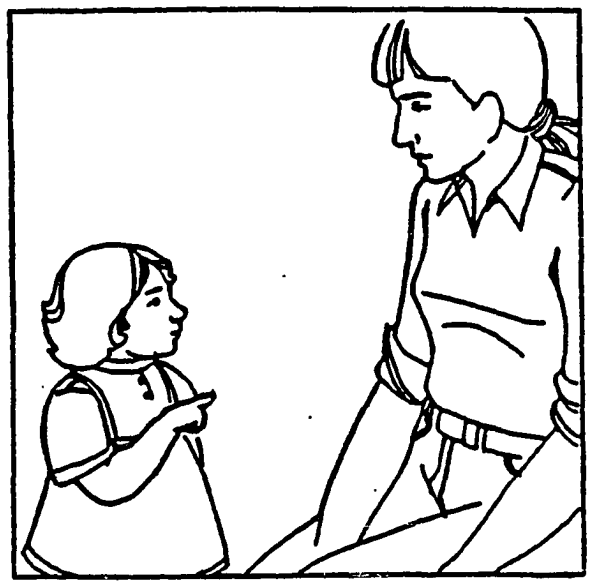
objects or places in her environment. Thus, the avoidance of a particular semantic function of the pointing form in ASL establishes the basic phenomenon.

4.3 Error Period: Ages 22 to 23 Months

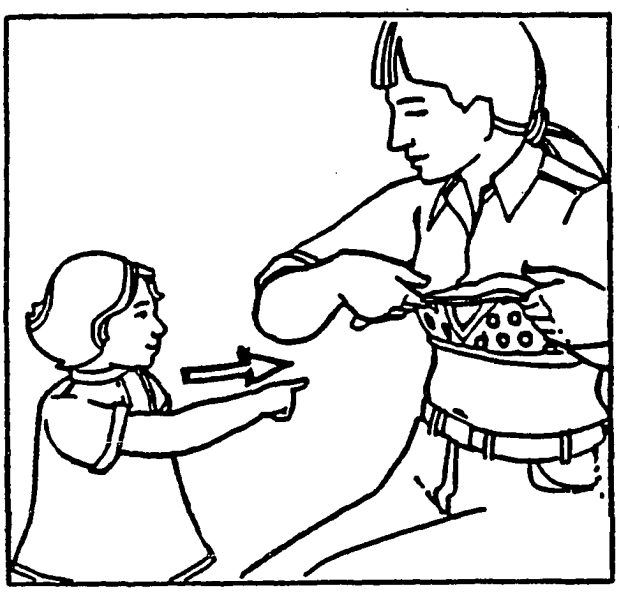
At 22 months, Kate produces pronouns for the first time. She produced third-person possessive pronouns to refer to non-present referents (as in HER or HIS); however, she did specify the intended referent (total=4).

Kate's use of pointing, however, was most unusual. For the first time since 10 months, Kate is observed to point to people, but in a manner which appeared to be different from adult usage: she pointed to people occupying second person role for the first time using the YOU sign, but the sense of the pointing sign appeared to mean ME. This interpretation is based on three types of evidence: (a) the formational difference between the YOU form and general deictic pointing; (b) total absence of the ME form; (c) contextual information, including mother's responses.

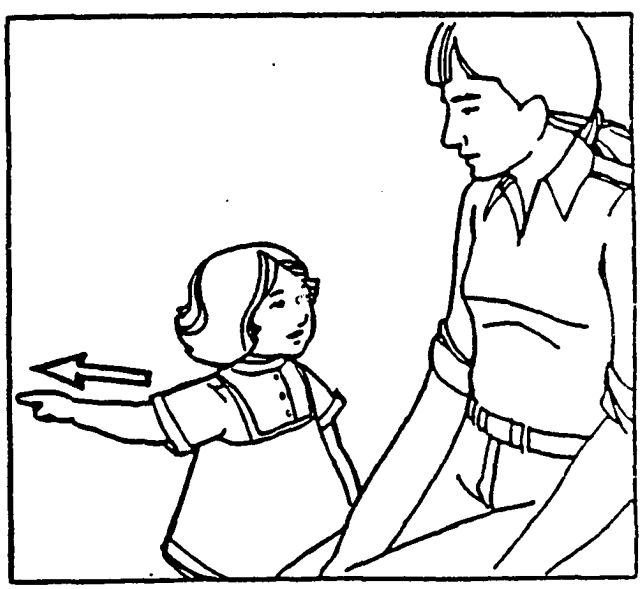
The first clue to the different status of her YOU pointing form compared to her deictic pointing to objects and locations was in its formation (Figure 8): Kate's YOU pointing was characteristically formed within the signing space with a bent elbow and eye gaze fixed on the addressee.



YOU



Deictic Points to Objects



Deictic Points to Locations

Figure 8.
Kate's Formational Differences in Deictic Pointing

Its restrained formational manner made it look much like the child's other lexical signs. Conversely, Kate's general deictic pointing at this time was signed mostly outside of her signing space with a straight elbow and eye gaze directed to the locus of the pointing form (or from the point's locus to the addressee and back).

The second clue was simply that Kate did not sign ME. However, she seemed fully aware of herself, and signed YOU in contexts that carried a meaning of ME, rather than YOU. Furthermore, she did not appear to use the YOU form in any other way, except to refer to herself. That is, at this time, she still did not use the pointing form to refer to other adults.

The third clue to the different status of the YOU form was in the contexts that it was used and the mother's spontaneous reactions to her child's utterances. Table 6 provides the three instances of YOU=ME errors found during this period. In the first example, Kate used YOU to indicate herself while signing to mother that she (Kate) wanted to eat. Mother's bewilderment at the meaning of her daughter's utterance is revealing. Because the actual form of Kate's utterance carried the meaning that <u>mother</u> should eat, mother responded by telling Kate that she (mother) was not hungry and would eat later. Kate, appearing disturbed over this misunderstanding, dragged her baby-bag (which typically

Examples of Kate's Pronoun Reversals from Naturalistic Data Samples[1]

TABLE 6

AGE	CONTEXT		NATURE OF ERROR
22 months	It is the last few minutes of the videotaping session. Mother and child are seated on the sofa looking through books and playing with toys. K spontaneously signs to M...	K: EAT *(pt.YOU) WANT EAT [EG:M]	YOU=ME
		M: WANT (pt.ME) EAT [NEGATION HEAD= NO] [+QF], LATER [AFF HEAD=YES] [looking confused]/	
		K: EAT [action: child gets off sofa, walks around table to other side of room, pulls baby bag across room to M's feet, and signs...]	
		K: EAT [looking at baby bag]	
		M: [Face = OH] WANT DRINK	
		K: EAT [EG:M]	
		M: EAT [action: M gives K some peanuts and her bottle]	
23 months	Mother and child are looking through a book of balloons. Child just finished naming the colors of the balloons.	M: LIKE PLAY BALLOON LIKE (pt.YOU) [Aff HEAD=YES]	
		K: SEE BALLOON *(pt.YOU) BALLOON [+QF,EG:M]	YOU=ME
		M: (M turns to camera and explains that the child really means ME and not YOU.)	
		K: BALLOON SEE *(pt.YOU) WANT SEE [+QF,EG:M]	
		M: (M asks =Do you[+C] want to see the balloon? Do you[+C] want to see it? Not Me. Not now Okay? It is in the car. When we are done here we will get it and blow it up. Let's finish up here first. Tell me, where is the flower in the book?)	
		K: FLOWER (pt. picture in book of flower)	
23 months	Mother and Laura engaged in conversation. K takes her swimsuit out of M's bag and interrupts by signing to L...	K: SWIM *(pt.YOU) [holding up her swimsuit to her own chest and pretending to swim.]	YOU=ME
		L: WHO	
		M: [NEGATION HEAD=NO], SWIM (pt.YOU) [action: M molds child's hand into ME sign.]	

[1: Please note that this page does not contain full transcript notations.]

contained Kate's bottle) from across the room to mother's feet and repeated the sign EAT. In the second example, mother and child had just finished reading a book about balloons. Mother commented to Kate that she (Kate) liked to play with balloons. Kate excitedly asked mother to be permitted to see her toy balloon, but instead signed "SEE BALLOON YOU BALLOON" (YOU=ME). When mother did not respond--she turned at this moment to make a comment into the camera--Kate repeated her request by rephrasing her original utterance, making it more emphatic, but nonetheless incorrect: "BALLOON SEE YOU WANT SEE" (YOU=ME). Mother's reaction to the child's error in this example is informative. Upon noticing Kate's error, mother casually turned to the camera and explained that the child really meant ME and not YOU, and then gently attempted to correct her daughter's error by recasting (or rephrasing) Kate's utterance. This suggested that Kate had been producing the YOU=ME error regularly, which was later confirmed in mother's notes on her child's sign development. The third instance occurred while mother was visiting the Bellugi Laboratory, and this time her response to Kate's error was much more direct and didactic. Mother and I were conversing between ourselves rather than attending to the child. In an attempt to gain my attention Kate (a) took her swimsuit out of her baby-bag, (b) held it up to her chest, (c) pretended to swim, and (d) signed YOU

SWIM (where YOU=herself or ME). Upon noticing the child's error, mother immdiately interrupted Kate, rephrased her utterance, and then physically molded the child's hand into the ME sign. Much to mother's dismay, the molding had little effect upon Kate; she repeated the error a moment later. At this time, it was decided to formally investigate Kate's knowledge of personal pronouns, and the pronoun elicitation tasks were administered several days later.

4.4 Results of the Pronoun Elicitation Tasks

4.4.1 Production and comprehension of YOU and ME pronouns. Kate's production and comprehension errors were distributed across all three tasks, rather than being restricted to a particular task. The elicitation tasks were successful, however, in that they yielded a corpus of 106 utterances in which Kate produced the YOU pronoun to intend ME on 26 occasions; there were no contexts in which she produced the YOU pronoun to intend the second-person pronoun and none where she produced the ME pronoun. Further, it was possible to assess Kate's correct and incorrect comprehension of pronouns in 18 contexts (11 for YOU, 7 for ME) . For the most part, Kate appeared to comprehend YOU as used by adults to refer to her (Kate; total=8 out of 11). There were 3 intriguing instances (out of 11) where Kate appeared to understand the meaning of the adult's YOU pointing form to

refer to them (the adults), rather than to her (Kate). (This error, of course, may have stemmed from the fact that this was precisely how she, Kate, used the YOU pronoun; that is, YOU=ME.) Although Kate did not produce ME, she appeared to comprehend this sign to mean the adult and understood this form to have multiple referents (total=7). Table 7, section I, summarizes the child's production and comprehension of personal pronouns across all tasks.

4.4.2 Performance on pronoun elicitation tasks. In addition to the profile presented above, a close analysis of Kate's performance on the tasks revealed her inappropriate comprehension and production of three other forms as well: Kate's name sign, third-person pronouns, and possessive pronouns. Each will be discussed below in the context of Kate's performance on the individual tasks.

(1) Task 1 Picture Identification Task: This task did not elicit Kate's production of pronouns, but did elicit the child's production of proper names. The child correctly identified the referents in 6 out of 7 pictures presented to her by producing proper nouns, and where appropriate, common nouns. A most surprising fact which emerged during the task was that Kate appeared unable to produce and comprehend her own name sign. The one error that Kate made during this task was in her failure to produce her name sign when presented with a picture of herself. Instead, Kate used the sign GIRL,

SUMMARY OF RESULTS - PRONOUN ELICITATION TASKS

AGE 23 MONTHS

I. Summary of Kate's production and comprehension of personal pronouns across all tasks.

Child's Production

Intended Meaning	YOU	ME
YOU	0	0
ME	26	0

Child's Comprehension

Adult's Production	YOU	ME
YOU	8	3
ME	0	7

II. Summary of Kate's performance on the pronoun elicitation tasks.

Tasks	Number of Items	Identificaiton Errors	Pronoun Errors Prod:(YOU=ME)-Comp	
1. Picture	7	1 (labeled pic of K as M)	2	-
2. Action	14	3 (refused to identify)	22	3
3. Hiding	8(trials)	1 (failed to comprehend name sign)	2	-

TABLE 7
Summary of Kate's Results from the Pronoun Elicitation Tasks

a sign which she had begun using productively a month earlier to denote female referents including her female friends, female domestic animals, and female dolls.[1] Refusing to accept this, mother attempted to encourage the child to produce her name sign "K". However, the child--appearing confused--instead re-labelled the same picture of herself by pointing to it and signing MOTHER (even though she had previously identified a picture of mother as MOTHER). An examination of the previous videotapes revealed that the child's name sign "K" was rarely used by adults, instead the pronoun YOU was used most frequently, and occasionally PRETTY GIRL. (Mother's notes confirmed this as well.) In addition, Kate produced YOU to intend herself on two (out of the 26) instances. While looking at a picture in which a person was eating ice cream, Kate spontaneously signed to mother that she (Kate) wanted to be given ice cream, but produced a YOU pronoun instead of ME:

ICECREAM [GESTURE:=want/give] ICECREAM *YOU WANT
(YOU=ME)

Thus, in this task Kate appeared to comprehend proper and common nouns as used by both the mother and the experimenter and produced them appropriately, but failed to comprehend her own name sign, using instead the sign GIRL,

which represented for her a general class of female referents.

(2) Task 2 Action Task: Of the 14 test items in this task, Kate correctly named all but 3, although mother reported that Kate did know their signs (toy phone, teddy bear, hand-mirror). Nonetheless, the task was successful in stimulating rich discourse among mother, child and experimenter. The analysis of this corpus revealed three types of errors: (a) consistent pronoun reversals, (b) third-person referencing errors, and (c) possessive pronoun errors.

(a) consistent pronoun reversals- By far, Kate's YOU=ME pronoun reversal error occurred most frequently (total=22 out of 26 total instances). Further, her use of YOU to intend herself was consistent; the referent of Kate's YOU was always herself and was never used to represent second person pronouns. Examples of Kate's production errors can be found in Table 8. In the first example Kate requested permission to take her own hat out of the "action bag", and signed YOU WANT instead of ME WANT (or WANT ME, or just WANT). The second example is particularly compelling. Here Kate described a photograph in which she was eating dinner; I was not in the photograph. Nevertheless, the child signed to me "EAT EAT YOU EAT (Pt:ss,+c,picture). . . ", while attempting to represent that she was eating. Furthermore, this example

Examples of Kate's Pronoun Reversals
from the Pronoun Elicitation Tasks[1]

TABLE 8

CONTEXT		NATURE OF ERROR
1. L and K playing with a shoe. K spots bag at L's side. K looks inside, sees her own hat and spontaneously signs to L...	K: HAT *(pt.YOU) WANT *(pt. YOU) WANT HAT HAT *(pt.YOU)/ [+QF, EG:L]	YOU=ME
2. K is kneeling before L looking at a picture that contains K's mother, father, and K. (In the picture K is seated on M's lap in front of a dinner table with food.) K spontaneously signs to L...	K: EAT EAT *(pt.YOU) EAT^{+} (pt.picture) EAT^{+} (pt.picture)/ [looks at picture] L: -WHO-/ EAT (pt.picture) YES (pt.pic) K: EAT (pt.picture) # FATHER^{+} (pt.picture) EAT FATHER^{+} [looks at picture]/ L: FATHER YES K: (pt.picture) MOTHER, [looks at picture] (pt.picture) GIRL^{+}/ (pt.ossLOC) [-EG] L: MOTHER YES (pt.picture) MOTHER/ GIRL GIRL (pt.pic)/ K: (pt.picture on box/K's) GIRL^{+} L: [L does not see child sign] M: (pt.picture on box/K's) [attention seeking tap,+index] GIRL (pt.pic.box) GIRL^{+}	YOU=ME
3. K wants a wooden spoon that she had been playing with earlier in the session. K spontaneously signs to L...	K: *(pt.YOU) [Invented Sign=SPOON,4 fingers in mouth] *(pt.YOU) PLAY Rh: *(pt.YOU) [IS:SPOON,1 index in mouth] *(pt.YOU) WANT *(pt.YOU)-- Lh: *(pt.YOU) WANT *(pt.YOU -- [IS:SPOON,index] [action: climbs up onto sofa to search for spoon]/	YOU=ME

[1: Please note that this page does not contain full transcript notations.]

contains several spontaneous instances of her use of the sign GIRL in self reference. In the third example, Kate wanted a large wooden spoon that she had earlier in the session. In addition to signing YOU for ME, she spontaneously invented a sign for spoon, for which she did not know the correct sign at the time. Within seconds of her first introduction of the invented sign, she modified it such that, by end of her signed utterance, the invented sign was formationally abstract and sign-like. This example provided a powerful demonstration of the child's understanding that referents had names--and she seemed quite willing to invent one where none (to her knowledge) existed.

(b) third person pronoun referencing errors- In general, Kate did not use the pointing form to refer to other people, but instead used proper nouns. On those occasions where she referred to another person with an indexical point (total=2), they had the form of her deictic pointing (rather than the YOU form). Here Kate's intentions seemed to be purely denotative and carried the meaning close to "LOOK OVER THERE" (signed, for example, while Kate deictically pointed towards the camera-person, but looked from the person to mother, with whom she was engaged in conversation at the time). The session did contain, however, two unambiguous attempts at third person referencing by Kate (one without an indexical form and one with) which yielded rather bizarre

errors. The first error involved the MINE-MY sign and is discussed below. The second instance involved a situation where Kate, mother, and myself were playing. I cut my finger and as Kate watched me bleeding, she turned to her mother and signed "YOU HURT". A close examination of the videotape revealed the unusual fact that the child (age 1;11) had taken on my role as if she had been cut rather than me, and matched her sign utterances to characterize this representation of the event (Figure 9). This argument is further supported by the fact that Kate had grossly distorted and painful facial expressions and clutched and pulled at her "bleeding" index finger as if she was in pain. Further, Kate's mother responded to her description of the event by attempting to correct Kate and sternly emphasized "NOT YOU HURT, (PRO 3= Laura) HURT, NOT YOU, YOU "K", YOU YOU (plus contact with Kate's chest). The point is that Kate could have merely used her knowledge of deictic indicating and pointed to me as she would point to a shoe or a door. Yet when Kate had to reference people, she seemed to avoid the use of any kind of indexical pointing at all costs--even to the extent of excluding a third party's role from the description of the event altogether.

(c) possessive pronoun errors- Kate used the first person possessive pronoun MINE 5 times during this task. On three separate occasions the child produced MINE during the

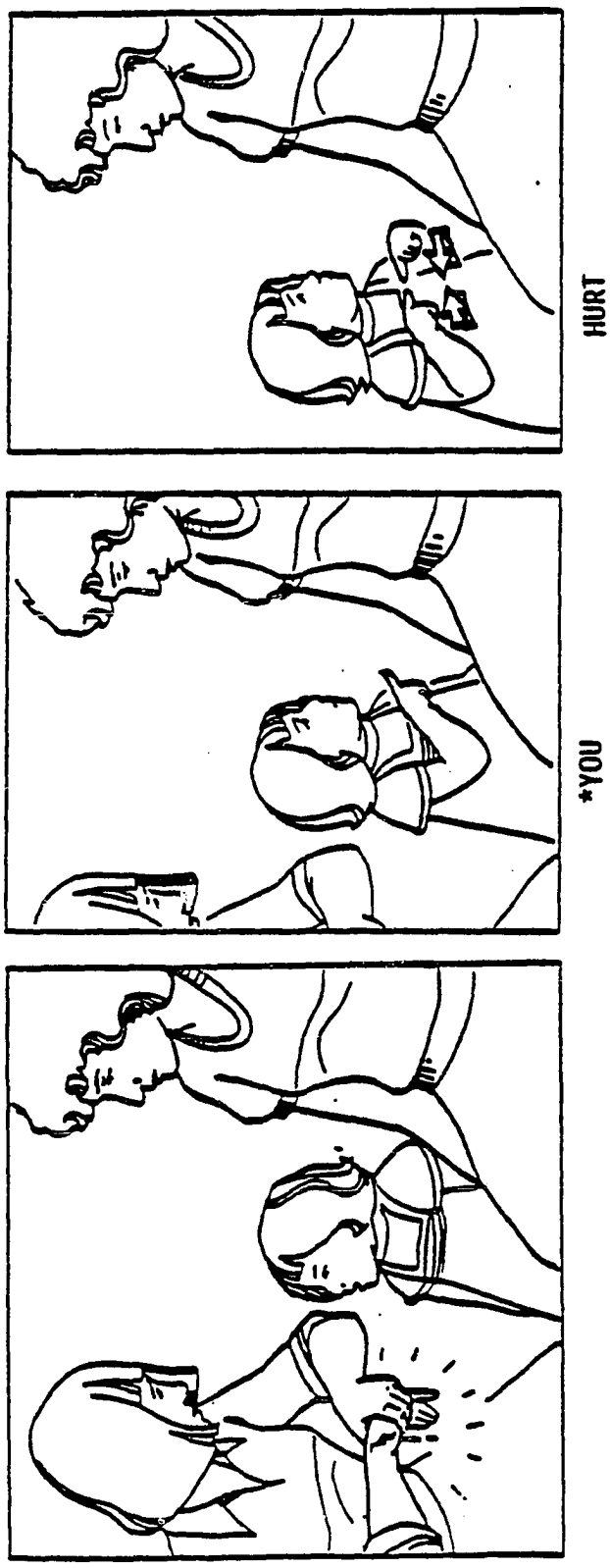


Figure 9.
Kate's Pronoun Error in Third Person Referencing

give and take of a routinized game with mother. In the game, mother pretended that some object was her own, when in truth, it belonged to Kate. For example, while Kate was holding her swimsuit mother playfully took it away from the child, and signed MINE and held the tiny swimsuit up to her own chest. Kate responded in turn by taking the swimsuit away from mother. After several interactions of this nature, Kate also produced MINE while removing her swimsuit from mother's chest (total=2). A similar event transpired with a hat which was not the child's possession (total=1); Kate never produced YOUR even though contexts arose where this form would have been appropriate. It was impossible to determine what Kate knew about this form based on these data. Nor was it possible to determine Kate's comprehension of MINE. The following examples, however, suggested that Kate's knowledge of this form was unstable at this time.

On two separate occasions Kate imitated her mother's MINE-MY sign incorrectly. More specifically, she correctly imitated the form of the sign, but failed with respect to its meaning. In the context of the following example Laura, Kate, and mother are seated before the camera. Mother instructed Kate to tell Laura that she (mother) wanted Laura to return her hat. (Laura had mother's hat.) Kate complied with mother's command, but produced an inappropriate utterance:

1. Mother signed to K: TELL HER (= Laura) WANT MINE MY HAT

1A. [Action: Kate turned 180 degrees to Laura and signed the following...]

2. Kate: *MINE (MINE=mother) HAT

2a. [Action: Kate took the hat from Laura, turned back to mother and gave her the hat.]

By using this possessive form the child failed at third person referencing. She incorrectly imitated mother's first person possessive form (i.e., MINE-MY), and used it to refer to mother in a situational context that required a third person possessive form. Kate produced a similar error with MINE in a second context with grapes. It is interesting that the child was receptive to imitation of the MINE-MY form but not the YOU and ME pronoun forms. One thing that might account for this is the fact that MINE-MY are formed with a flat "five" hand shape and not the indexical point. Kate's behavior is particularly noteworthy when one considers that she could have pointed deictically to mother (in a manner similar to the way she pointed to mother's blouse or necklace), thereby avoiding any ambiguity in this context concerning who wanted the hat; however, she did not use the pointing form to reference people at this time.

(3) Task 3 Hiding-Box Task: Of the 8 trials in this task (with 5 photos: doll, apple, mother, Kate, and Laura), Kate comprehended proper and common nouns used for these

referents by both mother and experimenter and successfully located the grapes under all but 1 of them. In this case, Kate failed to understand her own name sign, KATE, and did not retrieve the grape under her own picture. After nearly 10 minutes of mother's attempts to instruct Kate that KATE was her name sign, Kate gazed down at her own picture, pointed to it, and signed GIRL, the sign which she used for female referents; Kate also produced this sign to a picture of herself in Task 1. What is important to note is that this error is not due to Kate's inability to comprehend "self versus other". Nor is it due to an absence of a "naming concept" (i.e., knowledge that referents have associated names, which represent or "stand-for" them); the task established unequivocally that Kate simply did not know this particular form. Kate's behavior was exceptionally agitated during this trial, and was possibly due to the fact that she already had a form which she used to represent herself, namely the YOU form.

There were no instances during this task where Kate failed to understand a third person pronoun. However, the possibility exists that in comprehension, third person pronouns and general deictic pointing comprised a single undifferentiated class of indicating gestures for the child at this time. Finally, 2 (out of 26) YOU=ME pronoun errors occurred in the course of this task.

Table 7, section II, summarizes the child's performance on the 3 pronoun elicitation tasks described above.

4.4.3 Additional analyses. Several additional questions were asked to determine the precise nature of Kate's YOU=ME pronoun error in production: First, was the production error due to the occurrence of YOU and ME pronouns in the adult's immediately preceding utterances? That is, can this error be accounted for by Kate's imitation of mother's YOU sign (or is its occurrence prompted by mother's signing)? The answer is clearly no, as there were only 3 instances where the child's YOU was immediately preceded by a mother's YOU. Second, was the YOU=ME error restricted to a particular grammatical class of utterances in Kate's lexicon? That is, was the error routine or syncretic (unanalyzed) forms, such as "Iwanna" is for some English speaking children during an early period of pronoun acquisition? The constructions did not show such a pattern: 15 were without the WANT verb, while 11 occurred with the WANT verb, but not in a fixed order (5 WANT YOU and 6 YOU WANT). Thus, this error could not be accounted for by postulating that Kate was engaging in routinized constructions.

Finally, was the child's YOU=ME pronoun error susceptible to mother's correction either by molding or other means? Kate's YOU=ME error was impervious to explicit correction by the mother, nor did she imitate the mother's

explicit modeling of the correct way to sign ME. This observation about imitation is revealing. During the period when Kate was producing the YOU pointing form to intend ME, the mother attempted to correct Kate's error by molding the child's hand into the correct ME configuration. Such physical manipulation of the language articulators in spoken language is impossible. Given that this possibility only exists in signed languages, it might be thought that deaf children would be at a distinct advantage over hearing children. It might even be predicted that the correction of grammatical errors in the acquisition of a signed language would be easier and more successful in this population. However, Kate's error persisted despite mother's physical manipulations. The importance of this finding is twofold: (1) it provides evidence that the child cannot be forced to imitate linguistic forms that she is not yet able to analyze within her emerging grammatical system and (2) it points to a powerful resistance to environmental influence on the acquisition of grammatical forms irrespective of the mode of language transmission.[2]

4.4.4 Summary of pronoun elicitation tasks. A summary of the results from the pronoun elicitation tasks appears in Table 9. Surprisingly, the child in this study was found to use the second person pointing form YOU to indicate herself rather than the addressee. She did not produce ME, but

SELF REFERENCING:	-signs YOU to mean ME
	-does not sign ME (comprehends ME)
	-uses GIRL as her name sign
	-does not comprehend her name sign
ADDRESSEE AND PRO 3 REFERENCING:	-does not sign YOU (PRO 2)
	-uses full lexical forms instead of PRO 2 & 3
	-errors in attempts at PRO 3 referencing
OBJECT AND PLACE REFERENCING:	-deitic pointing to object and places error-free
	-object naming error-free

TABLE 9

Summary of Kate's Knowledge of Pronouns at 23 Months

appeared to understand it. She referred to herself (when not using YOU in self reference) with the sign GIRL and did not know her name sign "K". She did not use second and third person pronouns, but instead referred to people in these roles by using full proper nouns. Her few attempts at third person referencing yielded errors. Finally, her general deictic pointing forms to objects and places were error-free.

4.5 Correct Use of Personal Pronouns: Age 27 Months

At 27 months Kate possessed the full set of personal pronouns. She produced ME (total=3) in self reference, YOU (total=5) to refer to mother, and third person possessive markers (total=3) to refer to non-present people spontaneously and without errors. In addition, she produced the possessive forms MINE (N=3) and YOUR (N=1) spontaneously and correctly. Kate and her mother engaged in conversation about the child's friends who were not present. During this discussion, Kate referred to six of her friends individually by name and asked mother questions about each one of them. (Kate named one friend and subsequently referred to her by pointing to the chair that her friend typically sat in when she visited, an example of early anaphoric referencing). Finally, Kate demonstrated clear evidence of knowing her name

sign ("K"), and produced it on two occasions. Exactly what developmental changes took place between 24 and 27 months that led to this knowledge cannot be known; the child's parents moved to a new residence and videotaping was temporarily suspended during this time.

4.6 Summary of Kate's Transition From the Gestural to the Linguistic Use of the Pointing Form

This child's transition from (a) the communicative use of the pointing form to denote self and others, to (b) the linguistic use of the pointing form to represent personal pronouns was characterized by two distinct findings (see Table 10). At 10 months the child had a rich repertoire of pointing gestures including pointing to objects, locations and people; from 12 to 18 months all pointing to self and others disappeared. At 18 months the child used the pointing form once again to reference people, but with errors. Thus, the deaf child's acquisition of the linguistic use of pointing is marked by a long period of avoidance of the use of the pointing form to denote person roles and a period marked by errors that resemble pronoun reversals in hearing children. This error is corrected by age 2 years 3 months. What needs to be explained is how the child's conception of the pointing form changed over time.

	AGE (MONTHS)	CHARACTERISTIC CHANGES IN POINTING BEHAVIOR (PERSON, OBJECT, PLACE)
	6	-no pointing
I (early)	10	-much pointing (115) to objects, places, and people (12 self, 7 other person)
II (middle)	12-18	-all pointing to self and addressee drops out -general deictic pointing to objects and places present -refers to self and other persons with full lexical forms (e.g., GIRL, MOTHER, FATHER)
III (error)	22-23	-error: YOU=ME (does not sign ME) -general deictic pointing to objects and places present -refers to self and other persons with full lexical forms (e.g., GIRL, MOTHER, FATHER)
IV (correct)	27	-correct use of ME and YOU (PRO 1 & PRO 2) -correct use of proper name "K" as her name -correct use of proper names in semantically-syntactically appropriate contexts

TABLE 10

Summary of Changes in Kate's Use of the Pointing Form

Footnotes for Chapter 4

1. It should be pointed out that she clearly understood that the child in the foreground of the picture was herself. She correctly described aspects of the picture in explicit detail (e.g., the fact that she had Edward Klima's hat on her head; that she was at Ed and Ursie's house--two people who were not in the actual photograph or present at the time of this testing session, whom she spontaneously identified in the course of her description; and that her mother and father were in the background of the picture).

2. The role of imitation in spoken language acquisition remains a source of considerable controversy amongst students of child language. Further, their seems to be vast individual differences in children's propensity to imitate speech. Some suggest (e.g., Fraser, C., Bellugi, U., and Brown, R., in Control of grammar in imitation, comprehension, and production, Journal of Verbal Learning and Verbal Behavior, 1963, 2, 121-135), that children's imitations seem to be in advance of their spontaneous speech. While others suggest (e.g., Ervin-Trip, S., in Imitation and structural change in children's language; In E. Lenneberg (ed.), New directions in the study of language, New York: John Wiley & Sons, 1970), that children's imitative utterances are less complex than their spontaneous speech. This author further concluded that the child's imitative speech was not "grammatically progressive" and thus not a central factor in the child's grammatical development. The results from this study would appear to support the conclusions of the latter author, although additional research is needed before any definitive conclusions may be reached.

CHAPTER 5: RESULTS, CHILD TWO

In order to evaluate whether Kate's behavior was unique the acquisition of personal pronouns was observed for a second child, Carla. As was the case with the first child, the two central questions were (1) whether the child's knowledge of personal pronouns is mapped directly onto her pre-linguistic knowledge of the deictic pointing gesture and (2) whether the acquisition of personal pronouns occurs in a continuous learning sequence. The results from child two appear below, followed by a summary and comparison of the data from both children.

5.1 Early Period: Ages 8 and 12 Months

At 8 months Carla did not point, but reached and grasped in ways typical of other hearing and deaf children at this age. At 12 months Carla's use of pointing was abundant and varied; all of the child-initiated communicative interactions with adults contained one or more pointing gestures. Carla's communicative behavior closely resembled that of Kate during the same period. Carla pointed to direct adults' attention to nearby objects (total=26) and to distant objects and

locations (total=20), moving her eyes from the adult to the locus of the pointing gesture and back to the adult. Included in her pointing gestures were 6 unambiguous points to other people (facial region or upper trunk). This yielded a total of 52 tokens of pointing gestures in one 30 minute videotape session.

Carla's use of pointing to other people resembled her other communicative pointing gestures; she pointed with an extended arm towards people in motion around her or to salient objects on their bodies, always with eye gaze directed to the adult. Three (out of 6) of Carla's pointing gestures to other people occurred in combination with other pointing gestures. While playing a candy-sharing game with mother, Carla produced the following sequence: (a) the EAT sign, followed by (b) a pointing gesture towards mother resembling the YOU sign and then (c) a gesture resembling the GIVE sign (open hand with spread fingers extended out towards mother, palm facing up). Based on the contextual information and the formation of Carla's gestures, it appeared that she was asking mother to give her some more candy, although her gestures did not have the precise form of signs in ASL. During this game Carla also pointed towards her mother (as in YOU), pointed to the empty cup in her own hand and then pointed to her sister's cup (which had candy in it). It appeared that Carla was again indicating that she wanted more

candy. Finally, while mother was pretending to eat candy (moving her mouth with large opening and closing movements), Carla pointed to mother's mouth and then pointed to her own empty cup.

On two occasions, Carla used the pointing gesture in a curious manner, which appeared to be similar to a YOU=ME pronoun-reversal error. While playing with a deaf research assistant, Carla (a) turned away from the researcher, (b) spontaneously produced a pointing gesture which resembled the YOU sign (but with eye gaze fixed on her own finger) and (c) produced an EAT sign (with eye gaze directed towards center-space rather than towards the researcher); she repeated this utterance a moment later. Exactly what the child intended in producing this utterance and why she turned her gaze away from the addressee to produce it are unclear. As such it is difficult to determine the knowledge underlying the use of the pointing form in this context. What was intriguing about the example, however, was the research assistant's spontaneous reaction to it. The research assistant, who was completely unaware that the study concerned the child's knowledge of pronouns, interrupted the play session to <u>correct</u> the child's signing "error". The research assitant interpreted Carla's pointing form as meaning ME (the child) rather than YOU, and responded by (a) recasting the child's utterance and modeling the correct,

adult way to request food (i.e., ME EAT), and (b) physically contacting the child's chest several times with her index finger (to emphasize to the child that the ME sign is formed to the chest rather to center space). These corrections, however, did not elicit a response from the child.[1]

A final example involved Carla's use of a non-indexical gestural form; that is, one which was produced with opening and closing, clasping hand movements, rather than with the deictic pointing form. The child used this gesture (and formationally related variants) as if they were lexical units in certain syntactic frames. For example, while looking through a book, Carla pointed to each referent on the page and then produced open-close hand gestures as if she was producing each referent's <u>name</u>. These gestures were not iconic, that is, no aspect of their form represented aspects of the referent. Nor were they real signs in ASL; instead, they were phonologically possible forms which seemed to function as fillers of lexical "slots" in these rudimentary sign "sentences". In particular, they maintained the rhythm and duration of a phrasal unit in ASL. The deaf child's use of these gestures is fundamentally different from the gestures produced by young hearing children, and is revealing for two reasons. First, it suggests that the child had knowledge of a naming schema, before she had acquired actual referent names. Second, the sign-like jargon of this deaf

child appears similar in type to the hearing child's acquisition of suprasegmental prosodic features such as intonation. It has been suggested that hearing children learn aspects of the intonational patterns of their language before they are able to utter recognizable words (e.g., Bever, Fodor, and Weksel, 1965). In a similar vein, it appears that this child was acquiring knowledge of the prosodic features of ASL (as represented by rhythmic and temporal properties of ASL signs), before she had mastered the ability to produced recognizable signs in this context. This phenomenon has not been described in previous studies of deaf children's acquisition of sign lanugage; it was also observed in Kate at this age.

Carla consistently responded to the adult's use of deictic pointing gestures by looking to the place in space that the point indicated. As was the case with Kate, the exception to this pattern was that when the adult pointed to Carla (as in YOU), she appeared to gaze directly at the adult's point rather than to the adult's eyes.

Table 11 summarizes Carla's early communicative behavior. To review, Carla did not use pointing gestures at eight months, but did use them at 12 months, pointing to objects, places and people in a communicative manner.

AGE	CHARACTERISTICS OF EARLY COMMUNICATIVE BEHAVIOR
8 months	-no pointing, no signing
	-reaching, grasping behavior
	-brief fixed eye gaze with mother
12 months	-pointing (total=52 in 30 mins.) to objects, places, and people (7 other person)
	-pointing in combination with signs and gestures (total=16)
	-pointing function: denotive (± intent, ± recipient)
	-increased eye gaze with adults
	-uses a small set of signs

TABLE 11

Summary of Carla's Communicative Behavior at 8 and 12 Months

5.2 Middle Period: Ages 15 to 18 Months

Beginning around 15 months and continuing through 18 months, one semantic function of Carla's use of pointing gestures disappeared completely: she stopped using pointing to people (mother, father, and others), and never used pointing to indicate herself. During this period, however, Carla's use of general deictic pointing to denote objects, locations, and events around her remained. This replicates the pattern previously reported for Kate. Figure 10 represents the percentage of Carla's total number of pointing forms per session which were directed to herself and other people (labelled "self" and "addressee", respectively, on figure). Figures 11 and 12 represent the relationship between Carla's use of the pointing form to self or addressee and her use of general deictic pointing forms to denote objects and locations (labelled "non-objects" on figures) over time. These figures indicate that during the period when Carla stopped pointing to people, her use of other deictic pointing forms remained abundant and rich.

Several standard measures of language development were taken to determine if Carla's selective avoidance of the pointing form to reference self and other people resulted from a general language deficit; the results suggested that the child's language was developing normally. First, during the period when Carla did not use the pointing form to refer to self and addressee, there was an increase in sign and

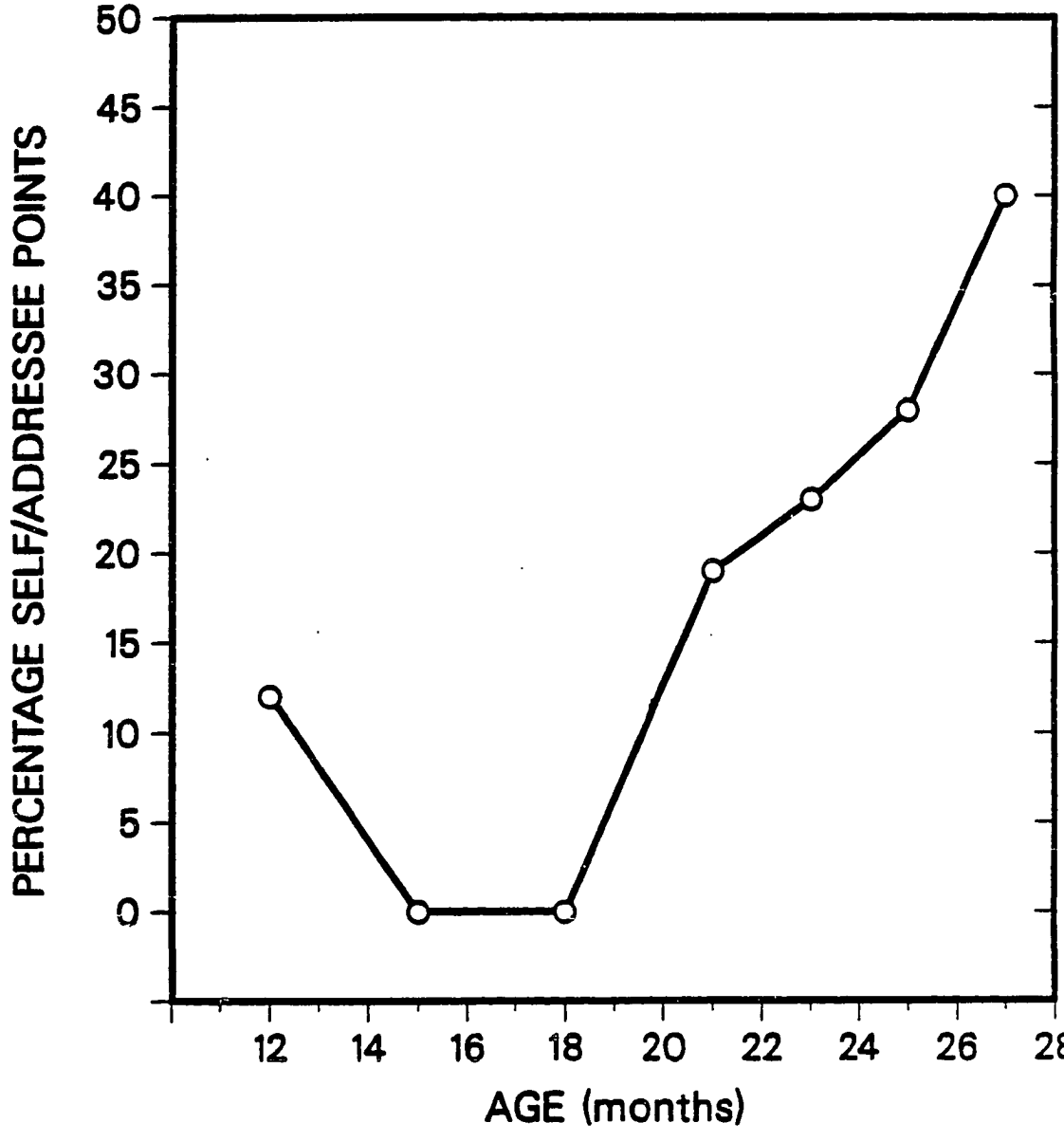


Figure 10.
Percentage of Carla's Total Number of Pointing Forms Directed to Self and Addressee

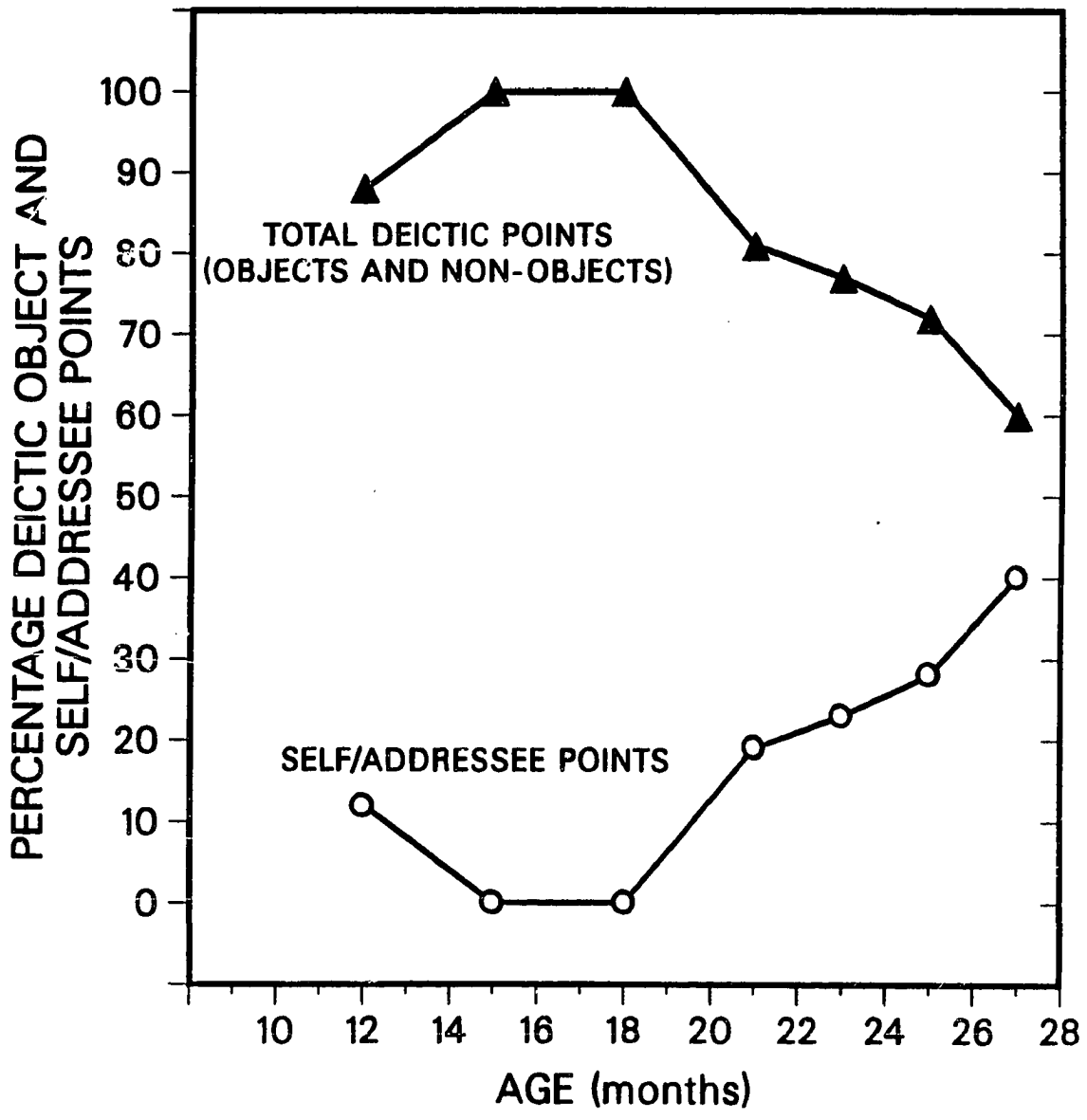


Figure 11.
Relationship Between Carla's Total Use of Deictic Pointing and Pointing to Self and Addressee

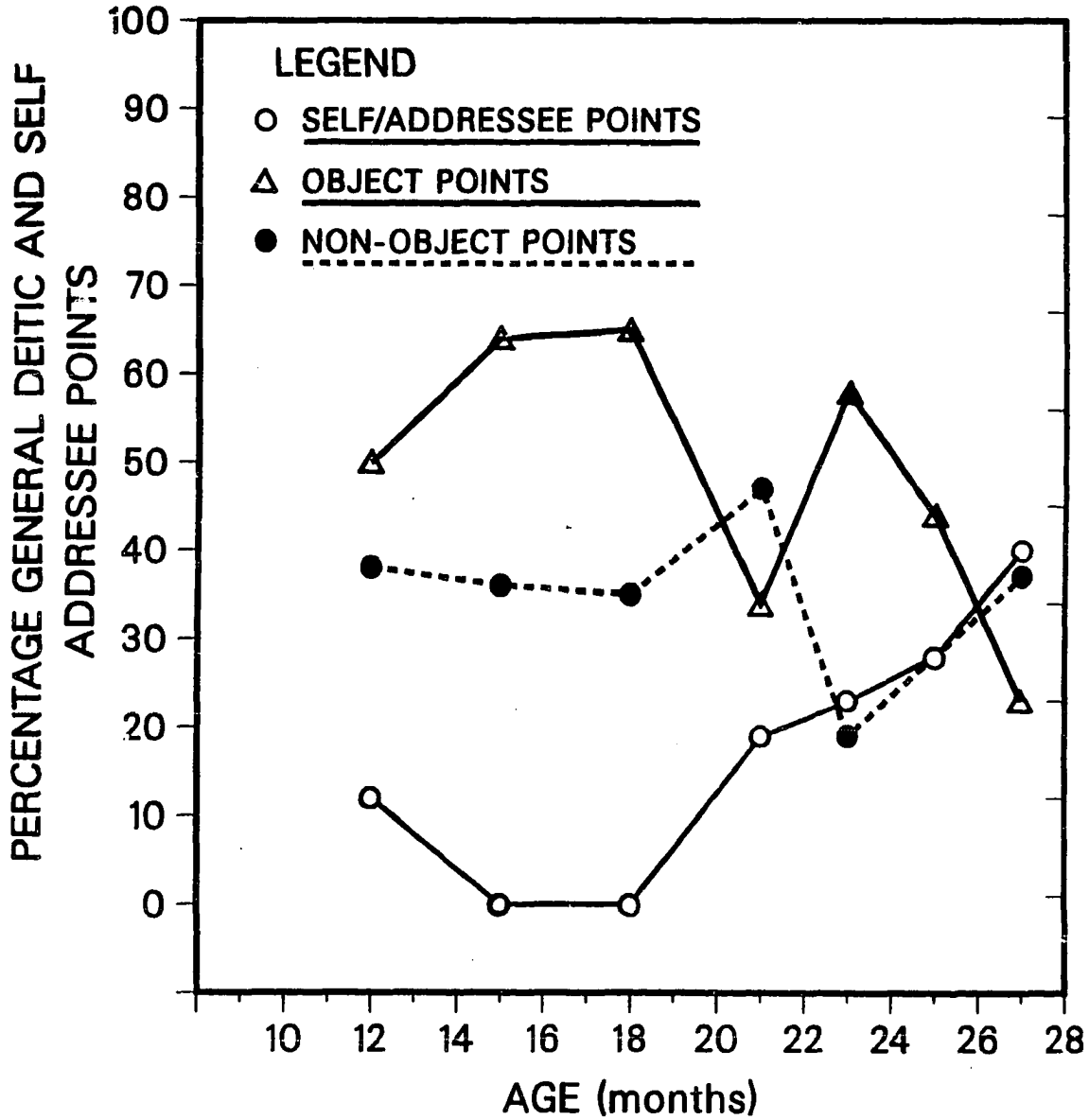


Figure 12.
Relationship Between Carla's Pointing to Objects and Non-Objects and Pointing to Self and Addressee

combination types (Figure 13). Second, her MLU steadily increased during this period (see Table 12 and Figure 14). Third, the number of signs which occurred alone decreased, while the number of signs which occurred in combination increased over time (Figure 15). Thus, during the period when Carla did not point to self or addressee, her other indices of language development appeared normal compared to that of other deaf and hearing children.

During this period, Carla referred to people by using full proper nouns. Carla used MOTHER (total=4) and FATHER (total=2) in contexts that required either the 2nd person pronoun YOU or the third person pointing form. Carla attempted to produce the hand movements which indicated her fingerspelled name, but did not form the letters properly at this young age.[2] Nonetheless, Carla had developed a strategy for indicating herself and her desires. First, she would wave her hand to obtain the adult's attention and then she would repeat her signs.[3] In particular, Carla did this most often with the signs GIMME/WANT, EAT, and WHAT. At 18 months, for example, when the child wished to eat some candy she (a) waved her hand at a deaf research assistant who was holding a bag of candy, (b) pounded the kitchen table, (c) signed CANDY repeatedly, and (d) moved her pointing finger from the research assistant's candy bag to her own empty bowl. The researcher questioned Carla, but failed to elicit

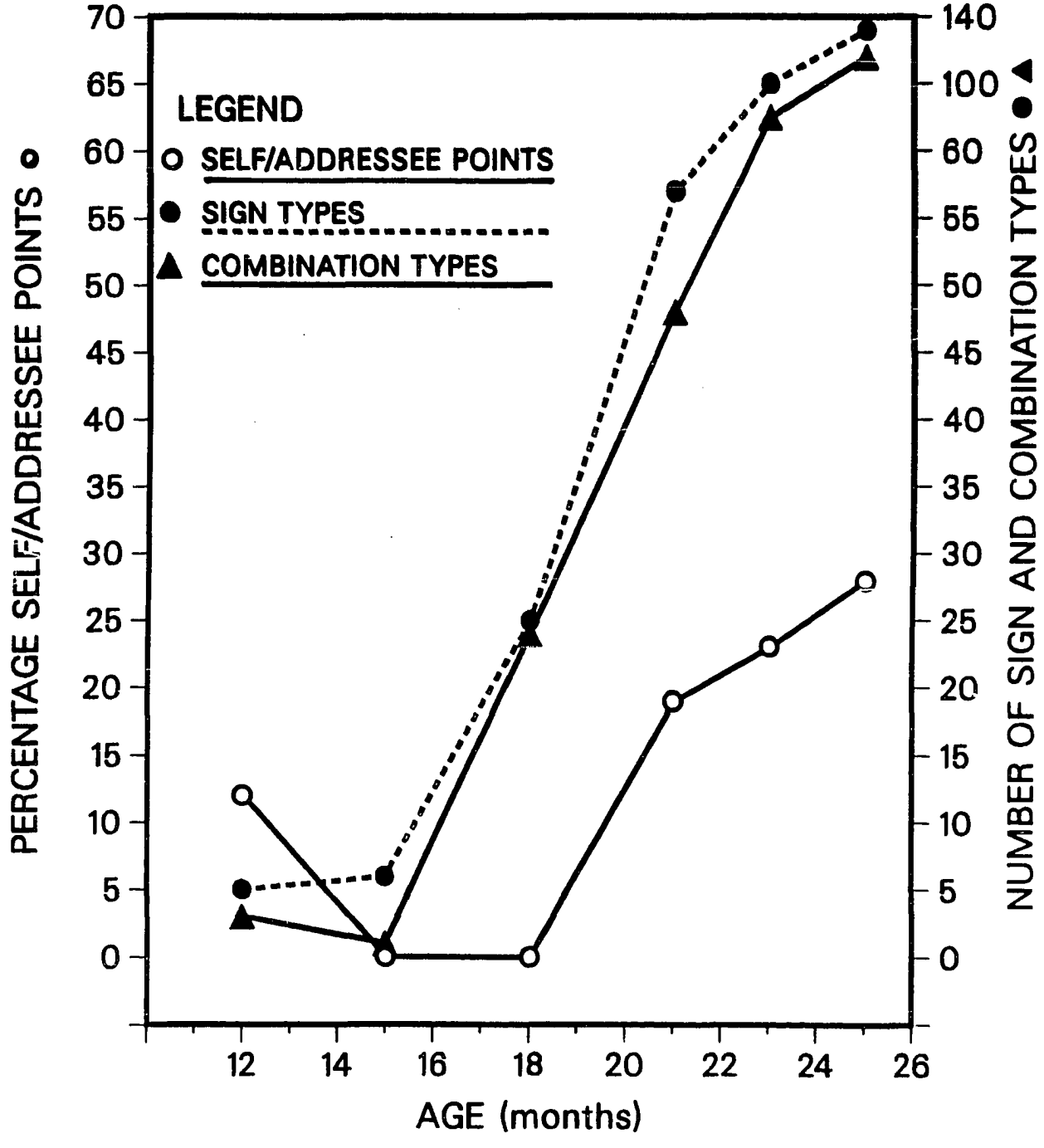


Figure 13.
Carla's Increase in Sign and Combination Types as Compared with Self and Addressee Pointing

NUMBER OF COMBINATION SAMPLES	AGE(MONTHS)	MLU	Sd	MAXIUM LENGTH
24	18	2.18	.52	4
48	21	2.92	1.34	8
75	23	3.04	1.64	10
114	25	3.68	1.70	9

TABLE 12

Carla's Mean Length of Utterance Containing two or more signs

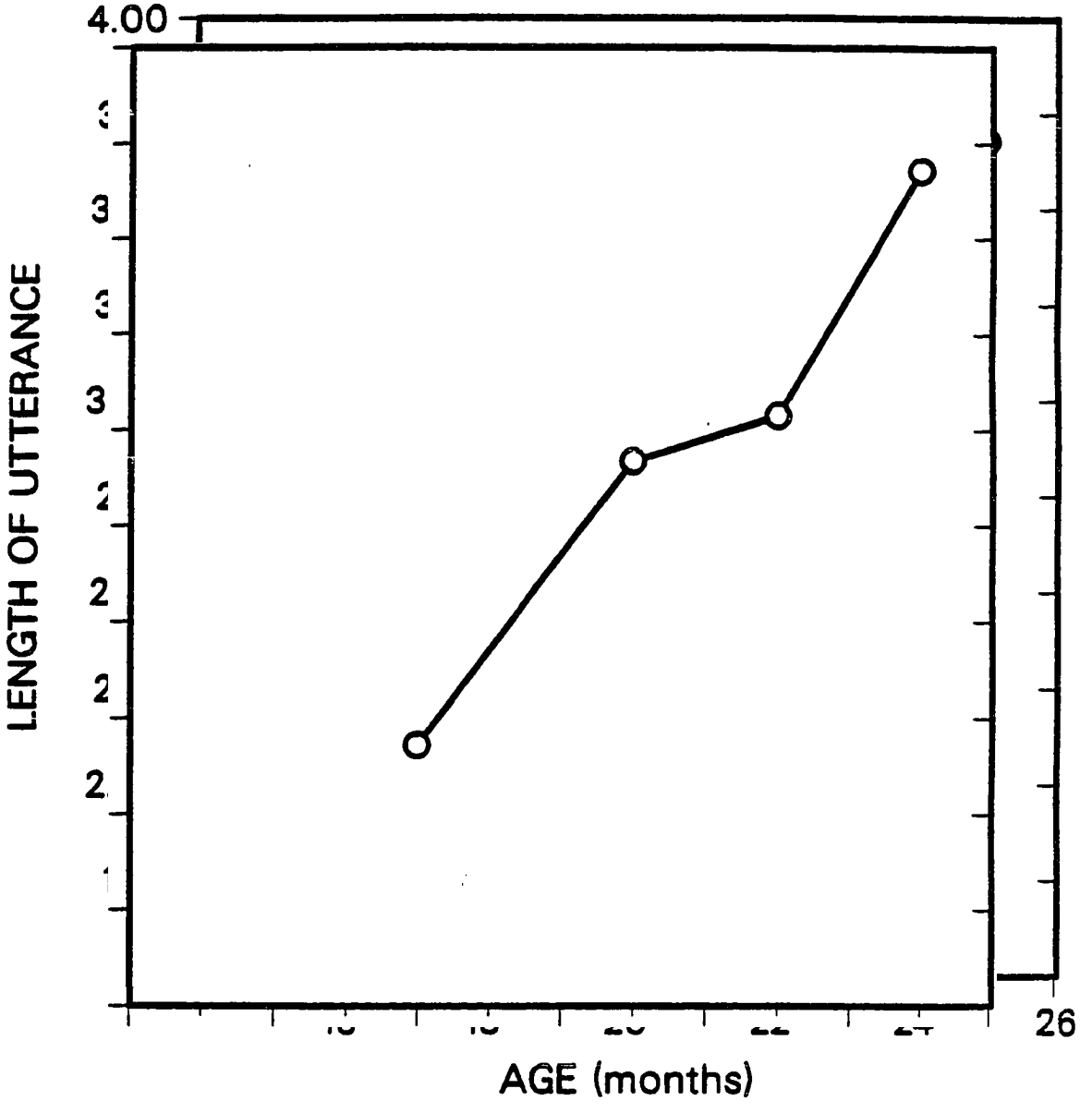


Figure 14.
Carla's Mean Length of Utterance

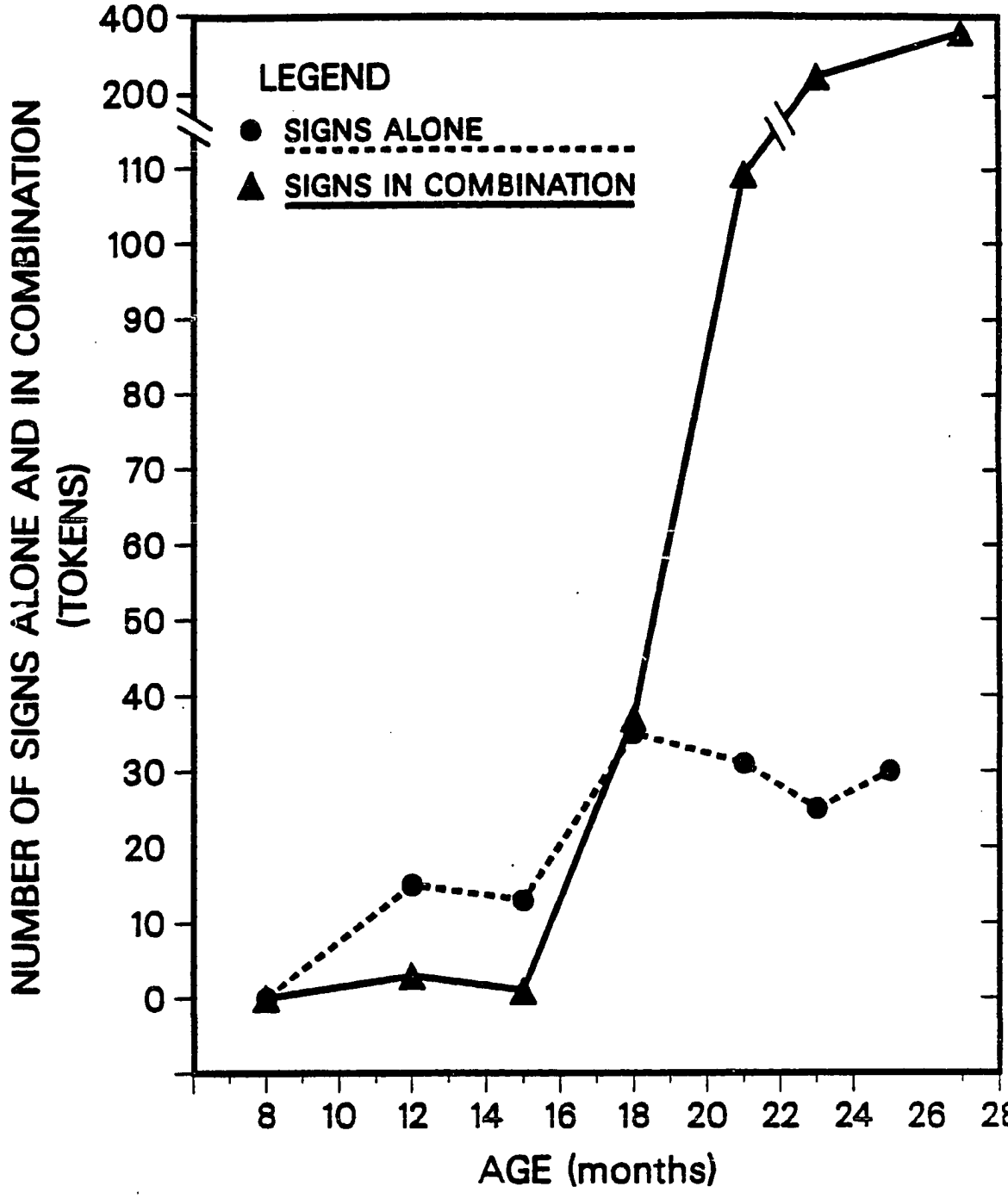


Figure 15.
Carla's Signs Occurring Alone versus Signs in Multi-Sign Combinations

the child's name sign (although Carla clearly wanted the candy). Nor did the child produce the pronoun ME. Interestingly, Carla's 3;6 year old sister--apparently wanting to spare her younger sister from the researcher's query--evidently understood what the researcher wanted and spontaneously molded Carla's hand into the sign ME. Carla ignored this, however, and continued to repeat the sign CANDY and point deictically from the researcher's candy bag to her own bowl. What is most interesting here is that Carla could have escaped this difficulty entirely merely by producing the pronoun ME, a form which she seemed to avoid at this time.

At 15 months, there was one exception to Carla's general avoidance in using the ME pronoun. Mother and child were playing a routinized questioning game in which mother repeatedly asked and answered the following question in ASL: "Where's mother? I'm mother! Where's mother?". Carla's response to this questioning game was to point to her own chest, copying the same form (i.e., mother's ME sign) as she had just observed mother producing. The illustrations in Figure 16 (which were drawn from the actual videotape) depict this example. Carla's mother, who apparently regarded the child's ME point as an error, attempted to correct her child by physically molding Carla's hand into a sign which from Carla's perspective could be interpreted as YOU, but from

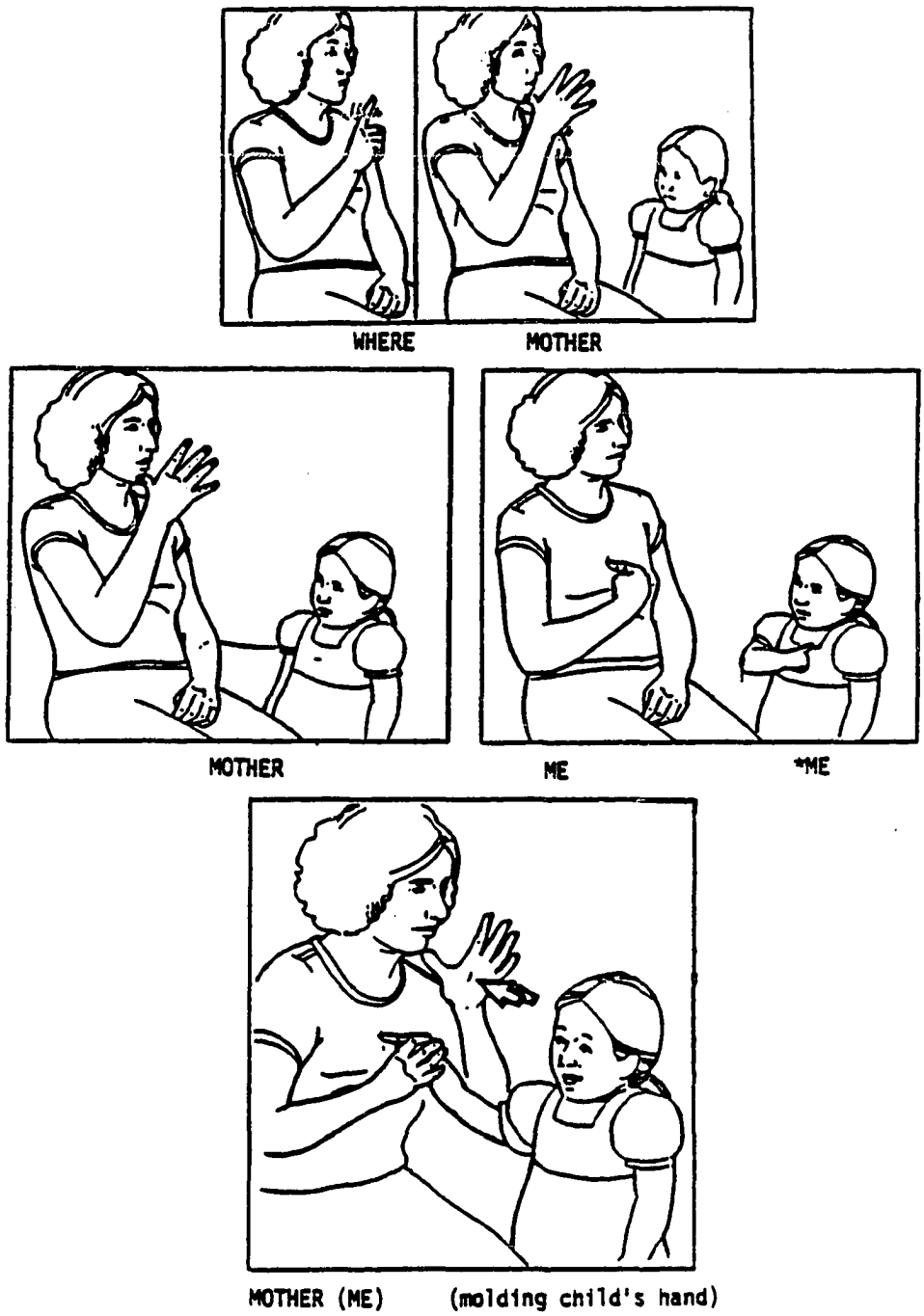


Figure 16.
Example of Carla's Early Use of the ME Pronoun and Mother's Correction

mother's perspective represented ME; as is evident, mother's molding does not always make things clearer. Kate's mother had attempted to mold her child's signs with a similar lack of success. It is not likely that Carla was making a productive ME=YOU pronoun reversal error. Instead, it seems more likely that in the give and take of the game, Carla imitated exactly what she saw mother doing when it was her turn to "answer" mother's question. Irrespective of the error's underlying cause, Carla's use of the ME pronoun (in a context which does not lead us to suspect that she had intended herself, but instead referred to her mother), supports the previous findings with Kate which suggest that the meaning of the simple pointing form is not transparent to the child.

Following the procedures used for Kate, three aspects of Carla's language and cognitive development were evaluated: vocabulary, discourse, and symbolic play. Carla's developments in these areas were in all respects normal, and comparable to those of Kate and hearing children of a similar age. Carla's vocabulary and frequencies of occurrence between ages 12-18 are presented in Table 13. As was the case for Kate, this table provides a conservative account of her vocabulary development, because glosses for Carla's deictic pointing forms are not included.

Finally, there was no indication at all that the absence

Vocabulary and Frequency of Occurrence
Carla from Ages 12 to 18 Months

12 mths		15 mths		18 mths	
CAT	1	AFFHD	1	AFFHD	2
DOG	2	EAT	4	ANIMAL	1
EAT	2	FINNISH	1	BED	4
GIMME	11	HAT	1	BIRD	2
THANK YOU	2	HEY	3	BOOK	1
		WHAT	4	CANDY	15
				CAR	2
				CAT	1
				CLOSE-EYES	2
				COME	1
				EAT	2
				FATHER	2
				GIMME	1
				HEY	5
				MOTHER	4
				NEGHD	1
				NO	1
				PILLOW	1
				PUT	6
				RABBIT	2
				SHOE	1
				SLEEP	2
				WHAT	9
				WHERE	2

TABLE 13

Carla's Vocabulary and Frequencies of Occurrence
Between Ages 12-18 Months

of self-other pronouns in Carla's utterances could be accounted for by its absence in the adults' sign input to her. Adults used YOU and ME pronouns quite frequently with Carla, and at times in contexts where these pronoun forms, if signed to other adults, would have been incorporated into the path movement of ASL verbs of motion.

5.2.1 Summary of Carla's use of pointing forms during the middle period. Out of the 101 utterances signed by Carla during the videotaped sessions between 15 and 18 months, there was not a single occurrence of the YOU pronoun, and there were no occurrences of the ME pronoun (save one imitation error) in the 153 utterances signed between 12 and 18 months. As was observed with Kate, the longitudinal analysis of the acquisition of personal pronouns in a second child, Carla, revealed that a selective function of the pointing form had dropped out, while deictic points remained. This finding replicates the pattern of avoidance previously observed for Kate.

5.3 Error Period: Ages 21 to 23 Months

5.3.1 21 months. Carla's pronouns appeared at 21 months[4]; this is comparable to the first appearance of Kate's pronouns at 22 months, and is also within the age-range (around 18 to 22 months) when pronouns first appear in the speech of hearing children. At this time, Carla produced

YOU (total=5) to refer to mother and to a researcher, and ME (total=6) in self reference, and she used third person pronoun pointing (total=4). Carla also produced the possessive forms MY (total=9), MINE (total=2), YOUR (total=4) and a third person possessive pronoun (total=3). Carla attempted to articulate the letters of her fingerspelled name despite the fact that it required complex movements; these attempts resulted in jargon-like approximations to her name (total=4) which continued through 25 months. Carla was unlike Kate in that a systematic pattern of productive errors was not observed in the longitudinal analysis of her signing behavior. She did not consistently err in signing YOU for ME. However, like Kate, Carla also did not use pronoun forms in an error-free manner from the start. She produced pronoun forms before she had fully mastered their linguistic functions, resulting in errors.

Three features characterized the child's use of pronouns during this period: (1) failure to specify non-present third person pronoun referents, (2) confusion over appropriateness of pronoun forms, and (3) inconsistent pronoun reversals.

(1) Failure to specify non-present third person pronoun referents: When referring to non-present referents, Carla used third person pronouns in ways commonly observed in other deaf children acquiring anaphoric referencing devices in ASL (e.g., Loew, 1980, 1983; Petitto, 1981). She produced third

person pronouns without specifying the referent. This omission is similar in type to the use of unspecified pronouns which slightly older hearing children sometimes employ during storytelling. For example, a hearing child might say "She went to the movies and saw her, and then she decided to go home". Because the referents of she and her are unspecified, a listener cannot determine who stayed to watch the movie and who went home. To reference non-present referents in adult ASL, a signer may either (a) establish a referent at an arbitrary spatial index in front of the body and inflect (or direct) subsequent signs (i.e., personal pronouns, possessive markers and the class of ASL verbs which move in space) to that particular spatial index, or (b) inflect signs towards a real-world spatial index which represents (or "stands for") that particular referent (e.g., inflecting signs towards mother's favorite chair when in discourse about mother who is not present). Syntactic and discourse rules determine which linguistic device is used by a signer (e.g., Padden, 1983). In either case, however, when in discourse about a non-present referent a signer must somehow specify the intended referent before subsequent use of pronouns or other signs. Failure to do so results in an "empty pronoun": one which has no referent. In the following example, Carla apparently wished to express to a research assistant that a particular hairclip belonged to someone, but

failed to specify the referent of her pronoun. Carla spontaneously introduced this topic by waving her hand to obtain the researcher's attention (a common "topic-initiating" device in ASL; Wilbur & Petitto, 1981), and pointing to the hairclip on the floor. Carla then signed a third person possessive marker slightly to the right of her body (formed correctly with a flat, open hand, with fingers extended and the palm facing outwards). However, no one occupied this space, nor was anyone else present at the time except the researcher. If Carla had first specified the pronoun's referent, it would carry the meaning of either HIS or HERS, depending upon the context. When the researcher requested clarification, Carla re-indexed the hairclip and pointed towards the left of her body, rather than to the space where she had originally placed the possessive marker. Whether the child intended to produce a third person personal pronoun in this context (albeit, unspecified), or whether she intended to point deictically to some location--possibly the location of the hairclip owner's room -- could not be determined; child and researcher went on to a new topic without resolving this issue.[5]

8. C: [Wave] (pt:object, hairclip)
(Child indicates the hairclip)

[Right space]
9. C: *3P-POSSESSIVE [unspecified referent]
(=belongs to X-someone)

_____+Question Face
9a. M: WHO 3P-POSSESSIVE WHO
(=Who does it belong to?)

10. C: (pt:object-hairclip) HAIRCLIP
(=that hairclip)

[Left space]
11. C: [Wave] *(pt:unspecified person or location indicating)
(=it belongs to X-someone, or child indicates a particular place which is unspecified)

(2) Confusion over appropriateness of pronoun forms: In this class of errors, Carla used the possessive pronouns MY and MINE in contexts where the personal pronoun ME was appropriate. The opposite pattern--ME used where MY or MINE was required--also occurred. Similarly, she sometimes used the personal pronoun YOU in contexts where the possessive YOUR was appropriate, and vice versa. In these cases, she does not exhibit semantic confusion over the referent of the sign (i.e., she does not show pronoun reversals), but instead errs in distinguishing when to use the personal and possessive pronoun forms. Carla's confusion over when to use these particular forms was at times evidenced by false starts and hesitations in the course of their use. At other times, Carla appeared to realize that she had erred and would change her own utterance. At 21 months, for example, Carla saw a researcher place some cookies which she brought to the family on the kitchen table. Wanting one, Carla (a) pointed towards

the table and (b) signed MY in this context in which the pronoun ME would have been more appropriate (see utterance number 52).

51. (pt:location) COOKIE COOKIE COOKIE!
52. (pt:location) *MY

The researcher did not give Carla a cookie, and moments later Carla (a) pointed towards the table, (b) signed MY, then hesitated (c) pointed briefly towards the table again, and then (d) changed her MY sign to a ME sign and pointed once more.

63. (pt:location) *MY [hesitation] (pt:partial,loc) ME (pt: location)

Upon receiving a cookie Carla signed ME appropriately three times while holding the cookie up to the researcher (and then eating it), but repeated her inappropriate use of MY rather than ME, to request another cookie several moments later.

These vacilations reflect confusion over when to use possessive vs. personal pronouns, rather than semantic errors over who or what the pronouns referred to. This interpretation is consistent with evidence from the literature on hearing children. A commonly-reported pattern is one in which a child produces errors while learning the rules governing the occurrence of complementary pronoun pairs. For example, the child's use of one member of a

pronoun pair is temporarily distrupted while mastering the rules for its complementary pronoun (e.g., I/ME, MY/MINE) (e.g., Charney, 1978; Leopold, 1949, Menn, personal communication).[6]

(3) Inconsistent pronoun reversals: Pronoun reversals (e.g., YOU instead of ME) were infrequent and inconsistent. Carla both produced YOU and ME pronouns correctly and made reversal errors. In contrast to the errors described in section (2), in which she used pronouns with the correct referent, but was confused as to whether the personal or possessive form was correct, these errors occurred because she used a pronoun whose referent was incorrect. The unstable knowledge of the referents of pronouns, resulting in inconsistent performance and infrequent, unsystematic pronoun reversal errors, has been commonly observed among young hearing children (e.g., Charney, 1978, 1980; Chiat, 1981, 1982; Leopold, 1949).

On one occasion, Carla seemed to want to express to her mother that she (Carla) was hungry and wanted some melon, but signed YOU instead of ME.

31. MELON (pt:location-refrig)
(=child indicates the location of the melon)

31a. [Action: child walks to refrigerator and then back to mother in the dining room.]

32. SOME
(=some (melon))

34. SOME(4x) *YOU

(=I (want) some! YOU=ME)

At this moment, Carla's 3;6 year old sister--appearing confused by the meaning of her younger sister's utterance--interrupted her sister by asking her if she (Carla) really meant to sign YOU. Carla responded by waving towards her sister (who had moved away), and then sign MINE!. It appears that in emphasizing that she (Carla) wanted some melon rather than "YOU", Carla used the wrong sign, although it was semantically appropriate; Carla should have used the ME sign in this context.

Several minutes later, however, Carla used the YOU sign correctly. While teasing Carla about a "monster" on the ceiling (which was in reality, a bug), the researcher asked Carla if she wanted to touch it. Carla responded by correctly signing YOU to intend the other person. Specifically, Carla shaked her head as in NO, signed YOU to the researcher, and then pointed to the bug.

Interestingly, the child showed a similar pattern of unsystematic reversals with first and second person possessive pronouns (e.g., MINE, YOUR); this reversal pattern has also been observed to extend to possessives in hearing children (see Charney, 1978, 1980; Chiat, 1981, 1982). Carla wanted to play with a doll which was in a glass case. Mother explained to her, however, that she could not have it because

it was her sister Jane's doll, and that she (Carla) should continue to play with the doll she was holding. Carla responded to mother in the following manner. (The hyphenated, capital letters represent Carla's approximations to her fingerspelled name sign.)

41. (pt:object-baby doll in Carla's arms) "C-A-C" (=this doll is Carla's.)

42. BABY "C-A-C" BABY "C-A-C" *YOUR, (pt:location-doll in glass case)
*3P-POSSESSIVE *3P-POSSESSIVE
(= this is your=my doll, and that one is someone's.)

Carla's use of the third person possessive pronoun in this example was also incorrect. As was described in section (1), Carla did not specify the pronoun's referent, nor did she inflect the pronoun to agree with either the location of (a) her sister's doll in the glass case, or (b) an arbitrary spatial index which would represent Jane who was not present. As such, it is difficult to determine whether Carla intended to reference her sister or her sister's doll, although it is clear from the context that she intended one of these referents.

Later in the session Carla used the sign YOUR correctly. In the following sequence Carla is indicating to the researcher that the purse on the floor was not hers (Carla's), but rather it belonged to the researcher.

87. [Negation--]

MY, YOUR, YOU, YOUR
(=this is not mine, it is yours, you, yours.)

5.3.2 23 months. At 23 months Carla produced ME (total=14) in self reference, YOU (total=4) to refer to mother, and third person pronouns (total=2). She produced the possessive pronoun forms MY (total=3), MINE (total=1) and YOUR (total=6). In addition, Carla produced approximations to her fingerspelled name sign (total=3). On four occasions, however, Carla used a first-person, personal or possessive pronoun to refer to mother, rather than to herself (ME=1, MY=2, MINE=1); Carla used these forms appropriately on other occasions. It appeared that these errors may have resulted from the child's imitation of mother's input; in all four cases, mother's immediately preceding utterances also contained a first person pronoun. The importance of these errors remain, however, because they demonstrate that Carla does not yet have full control over the use of these pronoun forms. In this way, the child's performance at 23 months resembles her inconsistent pronoun reversal errors which were observed at 21 months.

5.3.3 Summary of error period. Carla's inconsistent and unstable use of personal and possessive pronouns is due to her incomplete knowlege of their syntactic and semantic functions in ASL during this time. She failed to specify the referent of third person pronouns, used personal pronouns

where possessive pronouns were required (and vice versa), and produced unsystematic pronoun reversal errors. The primary difference between the performance of Kate and Carla is that the former showed systematic reversals of personal pronouns, while Carla did so only infrequently and inconsistently. As has been noted in the literature on hearing children, systematic pronoun reversing has been observed but is relatively uncommon (Charney, 1978; Macnamara, 1982). In this respect, Carla's performance is more similar to the usual pattern observed in non-reversing hearing children, while Kate's performance is similar to that of pronoun-reversing hearing children. These differences in the occurrence of pronoun reversals should not mask the basic similarity in the two deaf children's performance. Both acquired the use of pronouns over a period of time, during which they exhibited errors, a pattern similar to that observed for hearing children. What is most remarkable about this phenomenon in the acquisition of a signed language, however, is that it occurs despite the fact that the forms of these signs indicate their meanings in a seemingly transparent fashion; both children completely ceased to use the pointing form to refer to people while their deictic pointing remained. The linguistic functions of personal and possessive pronouns are not obvious to the child even though they are indicated by their forms. The similarity in the

deaf and hearing children's performance despite the fact that only the ASL signs exhibit a sytematic correspondence between form and meaning suggests that this factor is of little relevance to the acquisition process.

5.4 Correct Use of Personal Pronouns: Age 25 Months

At 25 months Carla possessed the full set of personal pronouns. She produced ME (total=16) in self reference, YOU (total=5) to refer to mother and others, and third person pronoun pointing (total=3). In addition, Carla produced the following signs: MY (total=6), MINE (total=1), YOUR (total=3), and approximations to her fingerspelled name sign (total=4). These forms were used spontaneously and without errors.

5.5 Summary of Carla's Behavior Compared with Kate and Hearing Children

Carla's performance showed the same essential features as were observed for Kate. Figure 17 represents the percentage of both Carla and Kate's total use of the pointing form which was directed to self and addressee. At 12 months, Carla used a wide variety of pointing gestures, referring to objects, locations and people. From 15 to 18 months of age, she avoided use of personal pronouns, but her deictic

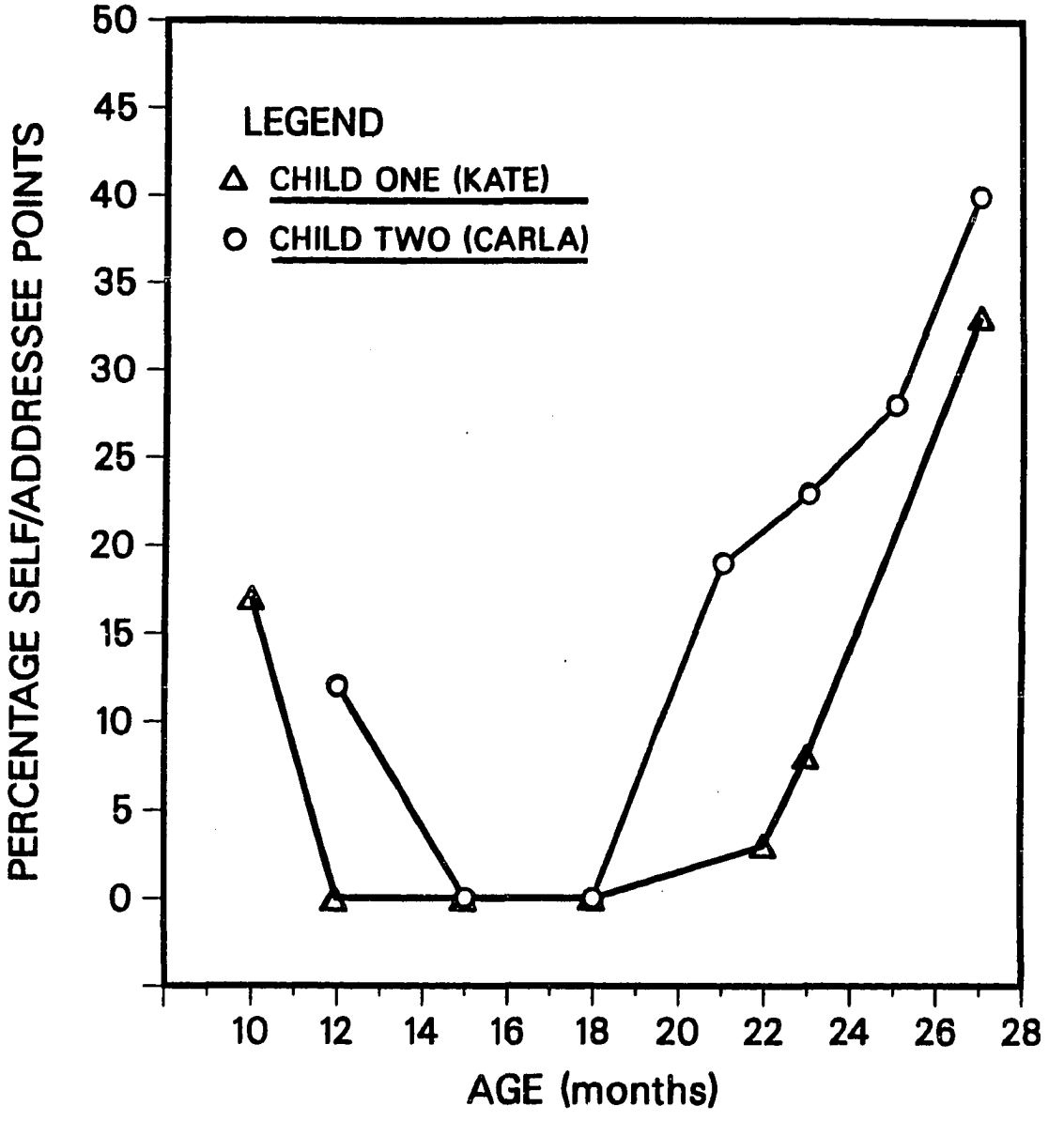


Figure 17.
Percentage of Carla and Kate's Total Number of Pointing Forms Directed to Self and Addressee

pointing remained. Her use of personal pronouns emerged around 21 months (comparable to Kate's 22 months) and was marked by production errors similar to those seen in the previous child's performance. These errors occurred despite the seemingly transparent correspondence between form and meaning in ASL. Performance of the two deaf children was very similar except that while Kate systematically used YOU to mean ME, Carla only did this inconsistently. Carla showed a greater preponderance of the other types of errors described above. Thus, the two children made the same types of errors, but with different frequencies of occurrence (see Table 14).

The deaf children's performance was strikingly similar to that reported for hearing children acquiring pronouns. The major milestones in the deaf children's acquisition occurred at times that correspond closely to those reported for hearing children: (a) the early occurrence of proper nouns to refer to people, (b) the first occurrence of pronouns around 18-22 months, and (c) correct use of pronouns by around 27 months. Between the ages of 12 and 18 months, both deaf children used only proper nouns to refer to people. Pronouns first appeared around 21-22 months, and correct usage was accomlished by 25 months for Carla and 27 months for Kate. These ages closely correspond to those observed for hearing children. As with hearing children, initial

CHARACTERISTIC CHANGES IN CARLA AND KATE'S POINTING BEHAVIOR

(PERSON, OBJECT, PLACE)

	Age	Carla	Age	Kate
I (early)	8	-no pointing	6	-no pointing
	10	-52 tokens of pointing to objects, places, and people (7 other)	12	-115 tokens of pointing to objects, places, and people (12 self, 7 other)
II (middle)	12-18	-self and addresse pointing drops out	15-18	-self and addressee pointing drops out
		-general deictic pointing to objects and places present		-general deictic pointing to objects and places present
III (error)	21-23	-inconsistent pronoun reversals	22-23	-consistent pronoun reversals (YOU=ME)
		-failure to specify non-present third person forms		-third person referencing errors
		-confusion over appropriateness of pronoun forms		-possessive pronoun errors
		-refers to self and other persons with full lexical forms		-refers to self and other persons with full lexical forms
		-general deictic pointing to objects and places present		-general deictic pointing to objects and places present
IV (correct)	25	-correct use of ME and YOU	27	-correct use of ME and YOU
		-correct use of possessive pronouns		-correct use of possessive pronouns

TABLE 14

Summary of Carla and Kate's Use of Pronouns

production of the pronouns was not error-free.

Having established the basic facts and similarities between deaf and hearing children's acquisition of personal pronouns, we may now turn to the more central questions posed by this research: what types of knowledge underlie the language acquisition process, and how does this process proceed over time? The deaf children's transition from the communicative use of the pointing form to denote self and others, to the linguistic use of the pointing form to represent pronouns, was characterized by two distinct findings which must be explained. Despite the transparent correspondence between the forms of pronouns in ASL and their meanings, the deaf children's acquisition of these signs was marked by (1) a long period of avoidance of the use of the pointing form to denote person roles and (2) a period of errors in usage. Thus, these results are consistent with the conclusion that the child's knowledge of personal pronouns is not merely "mapped onto" her knowledge of communicative pointing. Nor is the child's knowledge of the grammatical use of pronouns in ASL merely "built up" from her general cognitive knowledge of self versus other. Indeed, evidence from the children's use of proper nouns and from the reciprocal nature of their discourse with adults, strongly suggest that these children possessed a concept of self as distinct from others, but were unable to represent these

relations in an appropriate, linguistic manner. The essential problem, then, is to understand the changing conception of the pronominal system that underlay this behavior.

Footnotes for Chapter 5

1. That Carla does not point to herself (as in ME) during this early period is not indicative of a major developmental difference between the two children. It will be recalled that Kate's use of pointing to herself occurred at 10 months--precisely 6 days after her deictic pointing first emerged--and was within the age-range when pointing gestures first appear in hearing children (around 9 to 11 months). Whether this was also the case for Carla at 10 months could not be determined, because videotaping did not occur between ages 8 and 12 months. Although the occurrence of self-pointing could not be determined for Carla, its prolonged absence--during a period when the child potentially could have used the pointing form in this manner--remains the important puzzle to be solved.

2. The fingerspelling of Carla's name sign merits explanation. Fingerspelling is a system of twenty-six hand configurations which represent each of the letters of the English alphabet in a one-to-one correspondence. Less than 15% of ASL signed discourse involves fingerspelling (Wilbur, 1979). Names are often fingerspelled in ASL; Supalla (1982) has described the phonological rules governing the production of proper names in ASL. As fingerspelled by the parents, Carla's name was in accordance with these rules. That deaf children do not produce fingerspelled letters at this age has been documented by Maxwell (1980), and others.

3. Carla's use of repetition in these contexts appeared to be different from the use of movement repetitions which signal noun and verb classes in ASL (e.g., Launer, 1982; Supalla & Newport, 1978). Instead, the function of her repetitions appeared to be that of emphasis and self reference.

4. There were two instances of ME in an earlier videotape (20 months) which were not spontaneous, and therefore not included. The videotape included in this analysis is one which was unquestionably representative of a major shift in the child's use and knowledge of pronouns.

5. Examples of Carla's utterances contain only the essential transcript notations. A full transcription, of course, was made for Carla and included detailed information on eye gaze, facial expressions and the like. This information was included in the text notation only when it

provided important information concerning the meaning of the utterance. Approximate English translations are provided only where the meaning of the child's utterance was thought to be unclear.

6. I am very grateful to Dr. Lise Menn for providing me with important data on this phenomenon from her extensive unpublished diary notes on the language acquisition of a hearing child.

CHAPTER 6: DISCUSSION

These results present two immediate questions. First, given the deaf children's rich and continued use of deictic pointing, why does a selective function of the pointing form drop out? Second, given that the form of the symbol is very transparent relative to its meaning, why do the children make pronoun errors? These questions will be addressed in turn.

6.1 Why Does a Selective Function of the Pointing Form Drop Out?

The primary finding in this study is that a unique function of the pointing form drops out over a period of time for both children. It has been observed that the deaf children had a class of deictic points that they used for a variety of communicative functions, including reference to self (Kate) and others (Kate and Carla). Then a selective use of the pointing form dropped out. The children ceased to use the pointing form to indicate people, and instead used full proper nouns in the language to do so. What is puzzling is that at the same time that the children were not pointing to self and others, their general deictic pointing remained. When the children finally returned to referring to people

through pointing, their performance was marked by errors. Two facts must be explained: first, why a single function of the children's pointing behavior disappeared, rather than all pointing, and second, why YOU and ME pointing disappeared in particular.

Previous studies of language acquisition in hearing children invoke the notion of the child's avoidance of certain phonological and grammatical constructions. Several researchers have noted that avoidance can be seen in the hearing child's early acquisition of phonology (e.g., Ferguson & Farwell, 1975; Kiparsky & Menn, 1977; Leopold, 1949; Schwartz & Leonard, 1982). Here the child will avoid the use of certain words containing sounds that she finds difficult to articulate. Further, Menn (personal communication) argues that avoidance is a conscious process (although this is not necessarily being argued here), and that the conscious avoidance of difficult phonological constructions has been observed in hearing children as early as 13 months. What is unique about the "avoidance" behavior observed in the deaf children in this study is that they avoided a particular function of pointing, rather than a particular linguistic form. It is not that the children are unable to articulate this form; on the contrary, they point quite effortlessly beginning around 10 months, and they continue to use other types of pointing through the period

when errors occur. Rather, a particular grammatical function of pointing drops out. It would appear, then, that the reason this particular function is avoided must be related to its grammatical function.

One possible explanation can be derived from research on the hearing child's acquisition of word meanings, morphology and syntax. Gleitman and Wanner (1982) refer to "The Three Bears" description of the way words are regarded by children in their earliest sentences. The child is said to take a strict view of the way words function as components of propositions, assuming that each word encodes either (1) exactly one of the arguments of a predicate, (2) the predicate itself, or (3) a logical connective (such as and, or not; p. 12). "To the extent a received word codes more than one of the countenanced functions, it is too big; less than one, it is too small; exactly one, and it is just right" (p.12). In a similar vein, Slobin (1973, 1982) asserts that the child is biased to relating one meaning (or concept) to one word-like and acoustically salient surface form. He found that certain morphological units in inflectional languages (i.e., those languages that signal grammatical relations primarily with morphological units rather by changes in word-order), which have a single surface form with several underlying meanings (depending on morphological and syntactic contexts; e.g., Serbo-Croatian), take longer to

learn than acoustically salient morphological units with a single underlying meaning. In the former case (morphological surface units with multiple underlying meanings, termed fusional morphological units), the child is said to need time to sort out the multi-morphemic status of these forms and in doing so, may avoid the use of these forms until its components are fully mapped out.

This is particularly telling with respect to the pointing form in ASL, a synthetic (inflectional), rather than analytic (word-order) language. It would appear at first glance that the function of the pointing form is quite straightforward: One indexes something by pointing at it. On this basis alone, it is difficult to imagine why the children would ever avoid this form. However, the grammatical function of the indexical point in ASL is much more complicated than this; pointing enters into the language in a number of ways. Some of these are quite arbitrary in the sense that usage is determined by the grammatical conventions of the language. The functions of indexical pointing were outlined earlier in Chapter 2 (section 2.2.2). Briefly, these functions include the use of the pointing form (1) as a primary phonological unit, (2) as a primary component of the anaphoric referencing system, (3) as comprising one subset of the class of morphological forms called classifiers, (4) as personal pronouns, (5) as full

deictic terms within the grammatical system of ASL, and (6) as paralinguistic gestures. Thus, pointing in ASL represents a single surface form with complex underlying meanings and grammatical functions, and in this way can be viewed as similar to fusional morphological units.

On this basis, one might expect the deaf child to avoid the use of the pointing form entirely, until its various meanings and functions have been understood. However, this does not occur; rather, a particular function is avoided. The obvious explanation for this selective avoidance is simply that pointing has such a pervasive function in the language that its use cannot be avoided entirely. Furthermore, the children also appear able to distinguish between linguistic and extra-linguistic pointing, permitting them to continue using deictic pointing without disruption.

What must be explained, then, is why, among the various linguistic functions of pointing, the children specifically avoid first and second person pronominal pointing. The answer appears to reside in the particular grammatical and semantic properties of the class of pronouns. In contrast to the other lexical items in the children's vocabulary, the referent of a pronoun shifts depending upon the speaker. In addition, the use of pronouns is constrained by other grammatical processes (e.g., strict co-referencing rules). Finally, the children have an alternate means for

communicating the same information, namely through use of full lexical nouns. Thus, confronted with the pluri-functionality of pointing in the language, and the conceptual complexity of pronominal referencing, the children avoid YOU and ME pointing in favor of simpler lexical items. In this sense, the children can be said to be "avoiding" indexical pointing in favor of forms which remove any ambiguity.

6.2 Why Do the Children Make Pronoun Errors?

That Kate and Carla made errors while acquiring knowledge of pronouns is not remarkable in itself. The failure to specify a pronoun's referent, the inconsistent substitution of complementary pronoun forms, and even inconsistent pronoun reversals are commonly observed in hearing children acquiring pronouns. Such errors demonstrate that the deaf children were acquiring a language. That is, they were acquiring knowledge of (a) the linguistic forms in the language and the rules which govern their use, (b) the semantic scope and function of linguistic forms, and (c) the discourse and pragmatic rules for the appropriate use of linguistic forms in context.

The most remarkable of the errors, however, were Kate's consistent YOU=ME pronoun reversals. These merit our special

attention. The significance of this type of error is that it provides a most revealing window into what the child knows about language. Given the seemingly transparent relationship between the pointing form and its meaning, the power of Kate's error is that it is completely unexpected. Thus, these reversal errors, taken with the avoidance phenomenon described earlier, permit us to speak directly to current models of language acquisition. In the following sections the nature and origin of Kate's reversal errors will be explored.

6.2.1 Egocentric hypothesis. The deaf child's error in producing YOU (and failing to produce ME) resembles pronoun reversal errors reported among some hearing children (e.g., Chiat, 1981, 1982). One explanation of the hearing child's errors appeals to cognitive factors, in particular the idea that children must acquire the ability to shift perspectives. Piaget (1955) and others have suggested that young children are egocentric, failing to distinguish self from other. As a consequence, they are unable to take on the point of view of the listener in conversation. By this reasoning, the pronoun reversals of hearing children can be seen as resulting from a more general cognitive problem. Failure to understand that the referent of a pronoun depends on who is speaking results from the child's more general failure to understand his own role relative to others. The child's difficulties in

learning the pronominal system of a language are seen as continuous with a general problem in learning to distinguish self from other. This problem is thought to be manifested both in language and in other, non-linguistic domains.

The strongest version of this hypothesis predicts that in production, the child should consistently produce symmetrical pronoun errors and in comprehension, the child should regard YOU as her name and understand ME as having a single referent (e.g., mother). On this basis alone, we can reject the egocentric hypothesis; in common with pronoun reversing hearing children, Kate's reversals were not symmetrical and she understood ME to have multiple referents. Perhaps, however, a weaker version of this hypothesis can still be retained to explain the error that the child did produce. That is, perhaps the child produced the YOU=ME error because she failed to take on the adults' perspective for just this particular pronoun.

The case of deaf children acquiring sign languages provides the basis for a much stronger test of the perspective-shifting hypothesis than is possible in spoken language. In spoken language, a relatively small class of words which include deictic, kinship and role terms (Roger Brown, personal communication) require perspective shifting, whereas in ASL, the specific nature of its transmission requires that <u>all</u> signs be acquired by first taking on the

perspective of the signer. Consider the problem confronting the child attempting to learn new signs. The child cannot learn signs simply by copying exactly what she sees. For example, the child cannot learn to sign ME by exactly copying the ME gesture of another person; this would result in the child erroneously pointing to the other instead of herself. If mother formed the EAT sign and the child copied its exact form, she would direct the movement of the sign to the mother's mouth, rather than her own. Learning signs requires that the child be able to perform a spatial transformation, such that what she produces is the mirror image of what she sees, rather than its literal form. Failure to perform this transformation would result in perceptually-based errors. The important point is this: the mirror-image transformation required in order to learn signs presupposes that the child is non-egocentric. The child must be able to assume the perspective of another in order to form signs correctly. Thus, an egocentric child should be unable to perform the mirror-image transformation.

The weaker version of the egocentric hypothesis is thus contradicted by two facts. First, if the problem derives from a failure to shift perspective as a consequence of egocentrism, the child should exhibit global and pervasive reversals, with errors occurring for a wide range of lexical items. Essentially, the child should sign backwards. In

fact, this kind of pervasive reversal error does occur in the baby signs of very young children (ages approximately 10-12 months), but rapidly disappears. The error seen in this study is selective, however, in that it is specific to a particular lexical item in a particular grammatical class. Thus, while the egocentrism hypothesis can account for these early, global errors, it does not explain the particular error that remains. The child continues to make a substantive error long after the early errors resulting from a failure to shift perspective disappear.

It must be noted that the child definitely is imitating novel signs at this time, especially nouns, effortlessly and without error, including those signs with complex movements that require a shift in perspective. This casts severe doubt upon an explanation of the phenomenon that appeals to a general cognitive deficit of this type.

Again, this hypothesis cannot explain the asymmetrical nature of the pronoun error. The child signs YOU to mean ME, but does not sign ME to mean YOU. Ignoring for a moment the meaning of the child's pointing, the perspective shifting hypothesis suggests that when the mother formed YOU, the child should have been able to copy what she saw--namely, a point to her own chest--producing a point to her own chest. However, the child does not point to herself at this time. Thus, the child's asymmetrical error is wholly unexplained by

a perspective-shifting hypothesis, and implicates other factors.

6.2.2 Derivation of pronoun reversal errors. In this section it will be proposed that Kate's YOU sign is a non-reciprocal, non-deictic, "frozen" lexical sign that stands for her, and her alone. In short, it is her name, rather than a pronoun. Further, it will be proposed that the child did not have pronouns in her productive lexicon at this time. This analysis shares with Clark (1978) the notion that the child has formed the erroneous hypothesis that the YOU pronoun is her name. It differs from Clark's analysis, however, in its assumptions about the underlying cause of the error. Rather than producing the error because the child has failed to take on the perspective of the adult, I argue that to have made this error in the first place, the child had to shift, taking on the general perspective of other signers. Further, the incorrect meaning that the child has attached to the YOU form is a problem related to learning the structure of the linguistic system, rather than the by-product of a general cognitive deficit.

Specifically, the derivation of Kate's error appears to be the following: the child's error occurs at a time when she has clearly begun to understand the symbolic relationship between a sign and its referent. It occurs during a period when her vocabulary is growing rapidly and her MLU is

steadily increasing. At the same time, the frequency and distribution of her deictic points have begun to decline, replaced by full lexical nouns. It is at this time that the child observes other people using the YOU form to refer to her. Regardless of who is signing, the referent is the same (i.e., Kate). Thus, drawing upon her knowledge of sign-symbol correspondences, she hypothesizes that the YOU point is a symbol referring to herself, that is, a name sign. In effect, she is applying the sign-symbol schema that works for other nouns to the YOU point. That is, Kate has <u>over-symbolized</u> the indexical YOU point, treating it as a frozen lexical item with a stable referent, herself.

This analysis makes clear the fundamentally linguistic nature of the error. The child has abstracted a basic fact about linguistic systems, namely the abstract relationship between linguistic forms and their meanings. Rather than indexing particular objects in the world, these linguistic forms have intensional content; that is they denote meanings or concepts rather than particular objects. The sign SHOE, for example, does not index a particular object, but rather stands in an abstract relation to a class of items. Kate's intitial hypothesis about the meaning of YOU is that it is a symbol of this type. The hypothesis that YOU refers to herself in the manner that SHOE refers to shoes is consistent with the evidence that is provided. She consistently

observes people using this form to refer to herself. The problem with this hypothesis about YOU is that, in the correct, adult use of the sign in ASL, it is in fact indexical. In hypothesizing that YOU is the lexical item referring to herself, the child ignores the indexical information provided by the form of the sign. Thus, the symbolization principle takes precedence, resulting in an error when applied to indexical signs.

Rather than reflecting a general cognitive deficit related to perspective-shifting, the YOU=ME error derives from the over-application of an abstract linguistic principle. The error is striking because the child ignores transparent, perceptually-salient information which she used to communicate pre-linguistically, and which she continues to use deictically. This information is ignored in favor of a symbolization process that <u>increases</u> the abstractness of the relationship between form and meaning. In the case of genuinely indexical signs such as YOU, symbolization results in an error.

Two facts would count as evidence against the hypothesis that Kate regarded YOU as her name for the reasons specified above: (1) if during the error period Kate produced the YOU form to refer to someone other than herself, or (2) if Kate comprehended the YOU form as referring to another person when she was not the addressee but an onlooker in a conversation

between two adults.

Regarding the first point, it is clear that Kate only used YOU to refer to herself. In fact, the child's YOU=ME error was unusually consistent. Further, there appeared to be a formational difference between the child's YOU form and general deictic indicating. It will be recalled that the formation of the child's YOU occurred with an index finger extended from a bent arm within the signing space, with eye gaze at the addressee, while general deictic indicating had an index finger extended from a fully extended arm, usually out of the signing space, with initial eye gaze directed to the locus of the indexical point rather than the addressee. This fact made it possible to monitor the child's referencing behavior to other people as well as herself (in a way that is not possible in spoken language). It is clear from the data that when referring to other conversational participants, Kate's tendency was to avoid the use of any kind of pointing, be it the YOU form or general deictic pointing. A powerful demonstration of this point was seen in the "bleeding finger" example presented earlier. In sum, the child's YOU pointing form was always used to refer to herself, and she avoided the use of third person indexing entirely, using proper nouns instead.

With regard to the second factor, was there any evidence that Kate understood the YOU form to refer to anyone else

other than herself? And, if Kate had the hypothesis that YOU=her name, did she become confused when she observed other adults pointing to each other in second person referencing? Surely the child must have observed her parents conversing and using YOU. Did she think that they were using her name? How might she interpret these adult pointing forms and still retain her hypothesis about the meaning of the YOU sign in her lexicon? The naturalistic and pronoun elicitation task data suggested that Kate did not appear to be confused by this use of YOU, nor did she appear to make comprehension errors where they could be assessed. There is good reason why the adult use of YOU did not present kate with a problem: Although the child saw mother (and father) pointing to other people either to mean the second person pronoun YOU or a third person pronoun (e.g., he or she), she never had to interpret these forms as being within the linguistic system at all. From her viewpoint, the adult pronoun forms were formationally very different from the YOU point that the adult directed specifically to her. The pointing form was not directed towards the child's body, there was little or no eye gaze with the child, and the contextual information was inconsistent with interpreting the sign as referring to herself. Hence, from the child's point of view, the adult's YOU pronouns resembled the class of general deictic indicating gestures which were still outside her grammatical

control. As such, the child need never have read the utterances as pronouns, or for that matter, her name.

The few comprehension inconsistencies (3 errors in comprehending YOU out of 11 trials) in the pronoun elicitation task are noteworthy. Of the 11 trials where the adult signed YOU to the child indicating the child, on 3 occasions she understood this form not to refer to her, Kate, but instead to the adult. This is precisely the type of comprehension error that would be predicted based on the way Kate used this form. That is, Kate used the YOU form to intend herself. It is therefore not surprising that she would err by thinking adults might use this form to indicate themselves as well. Note that the child never failed at comprehending the adult's ME sign during the task. The importance of this comprehension error rests in the fact that it occurred toward the end of the child's YOU=ME error period. This suggests that Kate might have been entering a period of transition; one which moves her away from her fixed-referent representation of the relationship between the YOU pointing form and its meaning, to a more pronominal (reciprocal) representation of the shifting nature of the form's meaning.

Thus, the child's first hypothesis about the function of the pronoun pointing form appeared to be lexically-based; the child treated this symbol the way most other symbols (in

particular, nouns) work. The comprehension errors, albeit few, suggest that the child then gradually begins to sort out the symbol's grammatical function.

The final puzzle concerns the asymmetrical nature of the child's production errors. The explanation for the asymmetry appears to be as follows: the child signs YOU to intend ME, which always has a single referent, namely the child. She does not sign ME, because she already has a form to represent this meaning, namely the YOU sign, and in addition, ME always means the other person. Furthermore, given that her YOU sign seems to function as a noun denoting herself, it might be expected that she would fail to use ME simply because it cannot be said that pronouns were part of her productive lexicon at this time.

CHAPTER 7: CONCLUSIONS

It should be clear, then, that the children's problem was a linguistic one, related to understanding the functions of pointing in the language. What is striking is that although the relationship between the form of the symbol, the point, and its meaning, either ME or YOU, appears to be quite a direct, explicit one, it was not obvious to the children who were analyzing these forms within the linguistic system of ASL. Even though the pointing gesture has a transparent meaning qua gesture, its meaning became non-obvious as it was incorporated into the linguistic system.

In mastering the use of personal pronouns, the children in this study moved from interpreting pronominal pointing gesturally to understanding them as part of a grammatical system. Use of pronominal pointing was not simply "built up" out of the pre-linguistic pointing gestures. This is particularly surprising given that the language is constructed in such a way as to permit a simple transition between pre-linguistic pointing gestures and the use of personal pronouns. However, the idea that gestures can function as linguistic symbols is so powerful that it overrides the transparent indexical information that pointing

provides.

This phenomenon may provide additional insight into the acquisition of pronouns in spoken language. The children's acquisition of person pronouns resembles that of hearing children. Both acquire the use of personal pronouns over time, constructing and modifying different hypotheses about their meanings. Both deaf and hearing children make errors at similar points in time. Although it had been suggested by some that the transparent nature of the pointing gesture might make it possible for deaf children to acquire the use of these pronouns earlier than hearing children, this was clearly not the case. These similarities are stongly suggestive of a universal process of personal pronoun acquisition, one that holds despite radical differences in modality that would otherwise be expected to facilitate the sign process compared to spoken language.

The deaf children's avoidance of the personal pronouns, together with the errors that occur as they are introduced, provide telling evidence related to theoretical questions concerning reorganization of the child's knowledge structures in development, and discontinuities between linguistic and non-linguistic systems (Bowerman, 1982 a & b).

The data from this study suggest that the deaf child's knowledge undergoes a basic reorganization. The child shifts from conceptualizing person pointing as part of the class of

deictic gestures to viewing them as elements within the linguistic, or grammatical, system of ASL. The children's initial hypotheses concerning their function within the grammar are incorrect, and must be revised. The evidence for this reorganization is particularly dramatic, in that the use of certain simple indexical pointing gestures were temporarily lost during this time. The disturbance in the processing of these seemingly transparent gestures provides compelling evidence for restructuring of the child's knowledge. Although the hearing child's acquisition of pronouns may also entail this type of reorganization, it can perhaps be more clearly demonstrated given the unique form of pronouns in ASL. The cognitive or neurological basis for this reorganization is unclear, and needs to be further investigated. However, the existence of the phenomenon cannot be doubted.

With respect to language acquisition models which propose a "direct mapping" and a continuity between the child's cognitive and linguistic representations, this study demonstrates that the deaf child's transition from gestural pointing to the linguistic use of YOU and ME pointing symbols is not smooth and effortless. The assumption that linguistic capacity is built up from (or mapped onto) pre-existing cognitive and communicative competence in a cumulative and continuous fashion cannot be supported by these data.

Further, the data from this study compel us to consider aspects of grammatical structure and its acquisition process to involve a relatively specific--linguistic--rather than general--cognitive--type of knowledge which the child brings to the language acquisition process, whose structure and organization may be biologically endowed.

It cannot be said that there is no relationship between pre-linguistic and linguistic knowledge, or that language acquisition is unrelated to cognitive development. It can be said, however, that linguistic knowledge (concerning, for example, the relationship between form and meaning) is not merely constructed out of the non-linguistic materials at hand. In this sense, the acquisition process is discontinuous with other forms of knowledge.

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Publications

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Major Fields

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